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CONTENTS.

	PAGE.		PAGE.
Howe's Metallurgy of Steel	217	Imports from Great Britain	220
Impure Ice	217	The Knowles Mining Pumps	221
New Government Steel Contracts	217	Value of Undeveloped Ore-Bodies	222
American Mines and English Capitalists	217	Carbonic Acid in the Air	222
California Mining Bureau	218	Short Copper Assays	222
Horn Silver Mining Company	218	The World's Production of Spelter	222
From Furnace to Field	218	Formation of H_2O_2 by Electrolysis	222
Copper Ore Deposits near Morenci, Arizona	219	Export Trade of Germany	222
Tap Cinder	220	Patents	222
Germany and Bimetallism	220	Metallurgy of Steel	223
Securite—a New Blasting Compound	220	Personals	226
The Radiometer	220	Furnace, Mill, and Factory	226
		Contracting Notes	226
		Labor and Wages	226

MINING NEWS:		MINING NEWS:		MARKETS:	
Alabama	226	Utah	229	Metals	230
Australia	227	West Virginia	229	New York	230
California	227	Wisconsin	229	Iron	231
Canada	227	Wyoming	229	New York	231
Colorado	227			Louisville	231
France	227	MARKETS:		Philadelphia	231
Idaho	227	Coal	229	Pittsburg	231
Indiana	227	New York	229		
Kentucky	227	Boston	230	FINANCIAL:	
Michigan	228	Buffalo	230	Stocks	234
Missouri	228	Cleveland	230	New York	233, 234
Montana	228	Pittsburg	230	Boston	233, xiii
Nevada	228			Advertisers' Index	xiv
New York	228	FREIGHTS	230		
North Carolina	229				
Pennsylvania	229				

FINANCIAL:	
San Fr'cisco	233
Pittsburg	xiii
St. Louis	xiii
Gogebic	xiii
ASSESSMENTS	xiii
MEETINGS	234
DIVIDENDS	234
CONTRACTS OPEN	xix

WE repeat our notice, that Mr. HOWE'S treatise on the Metallurgy of Steel, which is now in course of publication in the ENGINEERING AND MINING JOURNAL, and which is by far the most complete and valuable work ever written in any language on the manufacture, properties, treatment, and applications of this metal, will extend through a year, at the average rate of five pages a week. Those who desire to secure this work complete should at once notify the publishers, otherwise it will be impossible to furnish full sets of the JOURNAL containing it.

IMPURE ICE.

The report of the State Board of Health on the purity of ice from Onondaga Lake, the Erie Canal at Syracuse, and Cazenovia Lake, is a valuable contribution to the literature of a subject which has but recently begun to receive at the hands of sanitarians the attention it deserves. In addition to the investigations which form the special theme of the report, it contains important citations from various sources, going to show that ice from polluted water has been the cause of disease; that the process of freezing does not, as has been popularly supposed, completely, although it does partially, remove the impurities dissolved in water, since from 10 to 80 per cent of these impurities may remain in the ice; that ice may be, moreover, grossly polluted by organic matter, which was floating in suspension in the water from which it was frozen; that a considerable percentage of the bacteria in a given water may be found in ice frozen from it, and that the vitality of many of these organisms is not destroyed by freezing.

Onondaga Lake is contaminated with the sewage of Syracuse, and its ice is pronounced dangerous. The canal ice is not so bad, perhaps, but it is also condemned. Concerning Cazenovia Lake, it is declared that there does not appear to be sufficient evidence to condemn the use of ice from it.

Perils of this sort are sometimes said to be peculiar to the present age. They arise from the multiplication of large cities and the introduction of sewage systems. If it be said that great cities with bad drainage existed in former ages, the answer is, that great pestilences have also characterized their history. It is, therefore, not the danger itself, but the new forms and wider distribution of it, which we may describe as modern. *

THE NEW GOVERNMENT STEEL CONTRACTS.

The announcement that four of our principal steel manufacturers have made bids for supplying the government with steel guns and armor plates has created a feeling of pride and satisfaction throughout the country, which brings forcibly back Scott's lines

"Breathes there a man with soul so dead," etc., etc.

It will be remembered that proposals were invited for "about 1310 tons of steel forgings, and about 4500 tons of steel armor plates and appurtenances," and as, of the four bidders, the Bethlehem Iron Company is the only one that seems to possess the necessary plant for fulfilling all the requirements, there is little doubt about their receiving the preference.

There is no reason on earth—as we have never ceased to affirm—why we should be dependent upon the foreigner for the manufacture of our war material, or why we should not make it ourselves!

Have we not more than all the money we may need, and will any one pretend that we have not sufficient brains?

One of the most important questions at issue in our own minds, and in the minds of a great number of our best engineers, is whether we really want guns of forged steel at all—whether cast-steel would not do as well—and whether the present contract for 1310 tons is not going to prove a very costly experiment, which might be made with equal satisfaction for much less money?

The late lamented Mr. A. L. HOLLEY, writing upon the subject, said: "We can hardly conceive of a fact of greater magnitude, from a defensive point of view, than this: that while the United States has at this moment not a single standard type of naval gun, or gun of position that is comparable in efficiency with the guns of foreign states, it has, by means of the good policy of its Ordnance Department, studied the results of foreign experiments, and avoided the enormous cost of original investigations; *and this policy must be now rewarded by the establishment of the cheap cast gun, the metal to be, not crude iron, but steel, having three or four times the strength.*"

We have underlined the last sentences because the authorities at our ordnance department do not appear inclined to verify these predictions.

Are they right? *Qui vivra, verra!*

AMERICAN MINES AND ENGLISH CAPITALISTS.

The fatal ill success, characteristic of so many English gold mining companies in this country, has been commented upon and accounted for, in these columns, over and over again. It has fostered a prejudice against American gold mines, which, if not insurmountable, is sufficiently deep-rooted to make British capitalists both wary and distrustful.

The majority of their past enterprises have been built upon sand, and the money obtained from them by lies and misrepresentation has been either artfully appropriated by designing rogues, or recklessly dissipated by blundering nonentities.

How many men of the "shabby genteel" type do we not know, who have had a *bond* on a gold property out west "with millions in it," and who, though willing to sell their interest for a song, have been unable to get even a hearing in our well-informed circles? When our impecunious friend has suddenly disappeared from our midst, so great was our relief that we have taken no trouble to find out whither he had gone; but when, after a short absence, he has smilingly returned and told us that his mine (?) was sold to "English capitalists for a million dollars," how could we refrain from crying out, *O tempora! O mores!*

There is fortunately no rule without an exception, as nothing could more clearly prove, than the report we have just received from the directors of the "Montana Company, Limited," and we therefore hasten to join in the congratulations, that are every where being tendered to those who have brought the "Drum Lummon" to its present state of prosperity.

For the year 1886, the profits amounted to the respectable sum of $950,000, and when, as it is intended, the payment of an interim dividend at the rate of 30 per cent per annum has been made for the first quarter of the present year, in April next, the shareholders will have received

no less than $1,740,000 since December, 1885, or rather more than half the capital originally subscribed.

The expenditure on plant, etc., during the year, is set down at $252,320, principally absorbed by the erection of a new 60-stamp mill and Frue vanners, and although this amount is, at first sight, a somewhat startling one, it was amply justified by a return since March, 1886, of $349,139.

The reserves of "ore in sight" are said to have increased from 141,251 tons to 203,763 tons, and great hopes are hence held out of augmented production, and higher grade material.

It can not be denied that such statements as these are well calculated to revive the drooping courage of investors, for they prove beyond controversy that, as we have always maintained, American mines are both rich and profitable. It must, however, be borne in mind, that like every thing else in this world, they should have fair play, and capable management, and be backed up and sustained by an all-round integrity.

THE CALIFORNIA MINING BUREAU.

The California State Mining Bureau has issued its report for the year ending June 1st, 1886, in two separate parts, one being the report of Mr. HENRY G. HANKS, who resigned his position as State Mineralogist May 30th, 1886, and the other being chiefly the report of Mr. WILLIAM IRELAN, Jr., his successor. This duplex publication naturally arouses our curiosity, particularly since Mr. IRELAN'S report ostensibly covers a period when he was not the State Mineralogist. But we find, on examination, that the two volumes are quite different in contents.

Part I. (144 pages), the report of Mr. HANKS, contains a general and somewhat desultory essay on California, followed by a paper on the building stones of the State; a table of altitudes (1297 localities); records of artesian borings; an account of seventy mineral springs of California; notes on the Calistoga silver mines, on the Arrow mining district in San Bernardino County, and on San Diego County; and an alphabetical catalogue of California minerals, with references to localities. While much of this material is interesting and valuable, it can not be said to constitute a comprehensive or systematic annual report.

Part II. contains a brief report of the Trustees of the Bureau, followed by a compilation hastily made by Mr. IRELAN, partly from notes of personal observations, partly from information furnished him by correspondents. This report deals with gold-quartz mining chiefly, and contains, as the author observes in the introduction, a short description of the developments made and the depths of some of the mines, with such statistics as he could collate, showing the method of extracting the gold, and description of the machinery in use. In detail, it gives descriptions of the following mines: In Amador County, the Plymouth, Keystone, South Spring Hill, Stewart, Moore, Downs, Mammoth, Zeile, and Arroyo Seco; in Butte County, the Spring Valley (hydraulic); in Calaveras County, Stickles, Utica, Angel's, Deep Lead (placer), Sheep Ranch, Gwin, Fine Gold, and Willard; in El Dorado County, the Stuckslager and Springfield; in Fresno County, the Abbey; in Nevada County, the North Star, Idaho, Empire, Providence, Wyoming, Nevada City, Delhi, Eagle Bird, and Spanish; in Sierra County, the Sierra Buttes, Young America and Alaska, and in Tuolumne County, the Keltz, Soulsby, and Buchanan. While this list is not by any means an adequate representation of the gold-mining industry of the State, it certainly comprises many of the most important and successful enterprises in that line; and it is a significant fact that of the 33 mills connected with the above mines, and tabulated on page 61 of this report, 29, of which 27 are stamp-mills, and 2 are mills with revolving crushers, are run by water-power, and only 4 mills are run by steam-power. Estimating the effectiveness of the two revolving-crusher establishments as equivalent to 80 stamps, we have 872 stamps running by water-power, and 100 by steam—a suggestive indication of the part which is played by the cost of fuel in the profitable or unprofitable treatment of average gold quartz.

Mr. IRELAN appends to his report a number of tables from various sources, giving statistics of production; an interesting paper on "Mine Drainage," by Mr. CHARLES G. YALE; tables showing weight of the different parts of quartz-mills; specifications for a 20-stamp gold-mill; a paper on "Concentration of Gold and Silver Ores on the Pacific Coast," by Mr. J. M. ADAMS, containing descriptions and cuts of the pointed box (*Spitzkasten*) sluice, with raising gate, buddle, Hendy concentrator, Frue vanner, Embrey, Duncan, Shaw, and Golden Gate concentrators; a brief note on "Chlorination," by Mr. IRELAN himself; an abstract from the forthcoming volume (since issued) of the U. S. Geological Survey on the Mineral Resources of the United States; the text of the U. S. Mining Law, and some of the Land-Office circulars (no digest of California laws—which is unfortunate); tables of weights and measures; and finally, an extract from the Political Code of California, fixing legal distances in the State. Evidently much of this matter has been introduced for the convenience of miners to whom the same information in other forms is not easily accessible. We are, therefore, not disposed to criticise its somewhat elementary and highly miscellaneous character. Moreover, criticism is disarmed by the circumstances of haste under which this report was prepared. We have no doubt that Mr. IRELAN will be able to produce next year a more comprehensive, symmetrical and original report. Meanwhile, this small preliminary book will prove to many practical miners, isolated in the Sierra, a handy companion and manual.

In one particular we can not forbear censure. Both Part I. and Part II. have been printed without tables of contents—an annoying omission, which the presence of a fair-to-middling alphabetical index at the end of each does not repair. A book should have both "contents" and index; and if the head is missing, there is no use in pointing with pride to the tail.

CORRESPONDENCE.

[We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.]

Horn-Silver Mining Co.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Referring to the scandals pertaining to the misappropriation of the Horn-Silver Mining Company's reserve funds and mismanagement of that company's affairs, I would remark that the present would be a good time for those stockholders "scattered from London to Utah" to undertake concerted action towards ousting the Messrs. Francklyn-Brown clique, and protect their property from further peculation.

A responsible committee once formed would receive substantial support. Yours truly,

THOMAS F. CHUCK,
Stockholder Horn-Silver Mining Co.

March 18.
P. O. Box 19, SANTA FE, New Mexico.

FROM FURNACE TO FIELD.

The Elimination and Use of Phosphorus from Iron, by Francis Wyatt, Ph.D.

While it is impossible to deny that the general application of the Bessemer, and Siemens-Martin processes, to the production of steel, has created a revolution in the whole iron industry, it is nevertheless a fact that their successful operation, solely depends upon the employment of iron pigs, which, while containing plenty of silicon, must be free from phosphorus and sulphur.

The supply of such a metal, when compared with what we can produce of a highly phosphuretted kind, is almost insignificant, and it has become necessary to seek for a method, whereby we may not only obtain good steel from inferior ore, but transform the present enemy into a valuable friend, by eliminating the phosphoric acid and applying it to agriculture.

Looking around us for examples of ores which have hitherto been neglected because inadaptable to the Bessemer process, we naturally turn to the Birmingham District of Alabama, the Chattanooga District of Tennessee, and the Cripple Creek District of Southwest Virginia, from all of which we are in a position to command inexhaustible supplies, of a composition set forth in papers read last February at Scranton, by Mr. H. S. Fleming and by Messrs. A. S. M'Creath and E. V. D'Invilliers, before the American Institute of Mining Engineers. We may select as an illustration, the following summary, compiled by the last named authors.

A. IRON ORES.	Fe.	P.	Sil. matter.	P. in 100 pts. Fe.	CaO.
1. Birmingham District.					
Average of 3 samples soft fossil ore	52·450	·265	17 777	·543	....
" " 3 " hard " "	39·425	336	12·077	·851	15·130
Analysis " 1 " gray " "	41·762	·307	28·450	·735	4·070
Average " 3 " brown (limonite) ore	50·687	·512	14·093	1·006	....
2. Chattanooga District.					
Average of 3 samples soft fossil ore	50·033	·549	14·603	1·093	....
Analysis " 1 " mixed hard fossil	26·600	·388	8 210	1·458	27·070
" " 1 limonite (Buford, Georgia)	53 425	·205	11·330	·383	....
3. Cripple Creek District.					
Average of 2 samples (new) Potsdam S.S. ore	45·075	·974	18·130	2·156	....
" " " (old) " " "	50·975	1·368	7·220	2·571	....
" " 5 " (new) "Mountain" ore	49·440	·428	11·238	·869	....
" " 6 " (old) " "	50·841	·196	10·332	·386	....
" " 34 " (new) limestone ores	54·766	·082	6·907	·150	...
" " 17 " (old) " "	54·514	·106	7·094	·194	....

The total cost of mining, and putting upon cars in the respective districts, is variously estimated at from 50c. to $1 per ton, and the rapidly extending transport facilities afforded by the railway companies daily render the exploitation of these ores more possible and advantageous.

Our present object is neither to explain, nor to criticise, the various processes by which these and similar ores may ultimately be made into steel, but merely to examine the question of dephosphoration, and to discuss the commercial value of the by-product. We may therefore at once pass on to the method invented by Thomas and Gilchrist, known as the "Bessemer basic," and so-called because the siliceous gannister, with which the converters, or other vessels, were formerly lined, is now replaced by a composition of dolomitic limestone.

Presuming one of the above ores to be made into a pig-iron which when melted, contains,

Si	00·15	MnO	1·00
C	2·70	S	0·15
P	3·00		

It is customary when making steel, to add to it in the converter about 15 to 18 per cent of lime, and then to blow for about ten to fifteen min-

utes. The silicon is the first to be dissociated. Then follows the combustion of the carbon, entailing at the same time some oxidation of the manganese and phosphorus, the decarburized metal sampled at this moment showing:

Si	0·018	MnO	0·250
C	0·125	S	0·150
P	2·000		

Immediately after the "overblow,"—as the continuation of the blast from this point for some few minutes has been called, and which, in reality, constitutes the period of dephosphoration—the composition of the bath will be:

Si	0·007	MnO	0·180
C	0·120	S	0·070
P	0 050		

And the spiegeleisen being now introduced and the operation terminated, the steel should be composed of—

Si	0·010	MnO	0·450
C	0·250	S	0·005
P	0·075		

It is concluded from a study of these reactions, that the oxidation and separation of phosphorus, result in the transitory production of $FeO_3P_2O_5$ which, lasting but for a few seconds, is destroyed with extreme energy and violence by the lime, and transformed into tetra-calcic phosphate, hitherto unknown to chemists, with the formula:

$$\left.\begin{matrix}CaO & 61{\cdot}20\\ P_2O_5 & 38{\cdot}80\end{matrix}\right\} = 4CaO,P_2O_5$$

As we have nothing more to say about steel, we may here leave it, and turn to the slags, which, while in a liquid state, are supposed to be a mixture of phosphate and silicate of lime, with variable proportions of free metallic oxides and earthy bases, and which, when cold, normally present the following composition:

CaO	48·00	MnO	6·00
P_2O_5	20·00	MgO	4·00
FeO	13·00	CaS	1·00
SiO	6·00	undetermined	2·00

The advanced state of our general knowledge, renders it unnecessary to do more than mention, that the demand for artificial fertilizing materials in this country is so swiftly increasing, that no less than 1,200,000 tons are now annually employed.

Of these fertilizers, the most important, that of which by far the greater proportion is necessary, is phosphoric acid. In the proper order of things, manures must be regarded from a commercial standpoint, as a means of accelerating, increasing, and cheapening food production, and they must restore to the soil, in some form readily assimilable by plants, all that preceding crops have taken away. Hence, when we discover that all the phosphoric acid of our soil is exhausted, and resolve to introduce fresh quantities, it matters very little, if at all, in what *form* we restore this valuable element, so long as it is in a condition to fulfill the functions we expect from it. The first condition to be attained in the use of phosphates, is a fineness of pulverization which will so divide the molecules, as to render them easily decomposable by the natural action of the elements contained in the soil, and in this we have hitherto only partially succeeded, by mechanical means. So long ago as 1851, Liebig recognized the difficulty, and proposed, in order to solve it, to chemically perform this disintegration, by decomposing the $Ca O_3P_2O_5$ with H_2SO_4 into what is known as superphosphates, thus:

$$CaO_3P_2O_5 + 2H_2SO_4 = CaH_4(PO_4)_2 + 2CaSO_4.$$

From the standpoint of disintegration, this method has been entirely satisfactory, and has enabled agriculture to rapidly obtain results from the use of phosphoric acid, which would otherwise have been impossible. From a chemical point of view, the whole theory fails, since we know that superphosphates are only soluble in water, so long as the sulphuric acid retains its ascendency over the lime, and that when they reach the ground, especially where carbonates are in abundance, the sulphuric acid is at once overpowered, and the phosphoric acid, unable to exist in a free state, is taken up by the lime and iron of the soil, and at once reverted to a tribasic form.

In other words, the whole question is one of time, and of dollars and cents. The farmer buys a ton of raw calcic phosphate finely ground, and containing 25 per cent of phosphoric acid, for $10, and if his land contains neither humus, nor acid elements, nor a sufficiency of lime, he will have to wait perhaps several years, before obtaining any appreciable results from his outlay. On the other hand, he buys a ton of superphosphates, containing only 15 per cent of P_2O_5, for $15, and, applying it to an exhausted soil, produces the desired result, on his next crop. Hence it is apparent that the phosphoric acid of the latter is more assimilable than that of the former case, and this assimilability can only be due, to the absolute state of division, insured by the series of decompositions to which the basic salt is exposed.

The interesting experiments of Wrightson and Munroe in England, undertaken to determine the value of basic cinder as a fertilizer, have already been noticed in these columns, and further extensive trials have, since theirs, been conducted, and commented upon, by other investigators. To say that the results have been entirely satisfactory, as compared with those obtained from raw calcic phosphates, is only to express the absolute truth in a very mild form, but it must be, nevertheless, admitted, that its efficacy does not compare quite so favorably with that of superphosphates. This fact is all the more regretable in view of the difficulty and unadvisability of treating slags with sulphuric acid, such treatment entailing the transformation of the ferric oxide into $FeSO_4$. Ferrous sulphate has long been generally recognized as an absolute enemy to vegetation, and soils containing it, remain sterile until, by constantly turning them, it has been transformed by the action of the air into ferric oxide. Dr. Voelcker has shown that the presence of about $\frac{1}{4}$ of 1 per cent of green vitriol is sufficient to vitiate plant growth, and although in the case before us, oxidation would, doubtless, soon occur, it seems absurd to apply to manurial purposes, what we know to be a detrimental agent.

In order to obtain the best results from phosphoric cinder, it is first necessary to place it in small heaps, well saturate it with water, and allow it to dry in the air. The decomposition of the caustic lime, the lime ferric oxide, and the calcium silicate, being thus effected, the reduction of the whole mass to an absolutely impalpable powder, capable of passing through a brass sieve with 0·005 holes, is next proceeded with.

To prove that the active principles of the cinder, thus prepared, are not by any means so utterly insoluble as many authorities have endeavored to make out, a small quantity may be digested for several hours in strong seltzer water, with occasional shaking, and will be found to yield up about 50 per cent of P_2O_5 and 55 per cent of lime.

We may therefore conclude that when placed in an ordinary soil the same reaction takes place, and that the tetra-basic calcium phosphate loses its water, and splits up into free lime, and a di-basic salt, thus:

$$CaO_3P_2O_5CaO + H_2O = Ca_2H_2(PO_4)_2 + 2CaO.$$

At the price of about $6 per ton, there should be no difficulty in selling any quantity of this valuable product to agriculturists, who will soon find more advantage resulting from its use upon clayey or very stiff soils than from any other fertilizer.

The real object with which agricultural experiment stations are so universally established in this country, is to encourage the study of ways and means to restore exhausted fertility, and maintain successful cultivation; and it is to these stations that we look for ample and impartial trials of our phosphoric slags. There is a natural diffidence, a general and easily understood hesitation on the part of farmers, to spend their scanty funds on innovations; but if, perchance, one happens to be more enterprising than his fellows, and obtains success, others quickly follow in his footsteps, and that becomes generally respected, which was formerly despised.

(TO BE CONTINUED.)

THE COPPER ORE DEPOSITS NEAR MORENCI, ARIZONA.

Written for the Engineering and Mining Journal by Carl Henrich, M.E.

When the cooling period of the porphyry was at an end, or toward the end of it, or sometimes after it had come to an end, a period of leaching set in, during which the water falling on and permeating through the porphyry, as well as subterraneous water-courses, attacked the pyrites in the porphyry mass, oxidizing the same and carrying the sulphates in solution. Coming in contact with the limestone, the iron and copper would be precipitated as carbonates of iron and copper, while the sulphate of lime would be carried off by the water. That the limestone boulders imbedded in the porphyry should come in contact with these mineral waters and be gradually converted into ore-bodies of iron and copper, is easily conceived. And this will account for those contact deposits, surrounded by the decomposed porphyry of the contact zone. In considering the leaching of the porphyry rock by the percolating rain water, we must remember that Arizona, at that time, had a very different and much moister climate, than it has to-day. Every where in that country, we find ample proof that it once was covered with large forests and with numerous, ever flowing water-courses. I have already mentioned the evidences of the huge conglomerate deposit, whose border comes to within one and a quarter miles from the mines, evidence of a large inland lake, fed by turbulent mountain streams, which carried immense masses of boulders and gravel into the lake during every rainstorm. The rainfall, which caused the accumulation of all this immense deposit of conglomerate in the depths of the lake must, indeed, have been copious and of frequent occurrence.

The contact and the limestone ore-deposits seem to have been of secondary origin, derived in all likelihood from the oxidizing action of the atmospheric agents on the pyrites deposits in the porphyry. The pyrites were more easily attacked than the copper glance, and converted into sulphates of iron and copper. These were dissolved by the rain-water. These solutions—very dilute, doubtless—came in contact with the surface of the limestone boulders in the porphyry and of the limestone underlying the porphyry. The softer parts of the limestone, or those parts which were easiest attacked and served as water-courses for the descending rain-water, carrying the iron and copper sulphates in solution. Carbonate of lime would react on ferrous and cuprous sulphates, to form insoluble iron and copper carbonates and gypsum, which latter would be dissolved in the water and carried off. The carbonate of iron would be easily converted into limonite, while the carbonate of copper would longer retain its original form. These deposits would therefore occur in the place of limestone, and really are masses of limestone transformed into bodies of iron and copper ore. That this is the fact, is further proven by the occurrence of boulders of limestone in the midst of the ore-bodies. The limestone in the vicinity of the mines is found frequently traversed by numerous small quartz veins, which give to it a peculiar and characteristic appearance. This same net-work of quartz veins is frequently found traversing the more solid ore-bodies of the contact and limestone deposits. This can be noticed especially in the more solid limonite bodies. These quartz veins of the ore-bodies are identical in shape and appearance with those permeating the limestone, and are an additional proof of the replacement of the carbonate of lime in the lime stone rock by the ore-bodies.

In many places of the mines, clay seams—selvages—are found as well between the ore-bodies and the decomposed porphyry as between the ore-bodies and the limestone. But in other cases, especially in those bodies deposited *in* the limestone, the ore gradually changes into limestone. These clay seams might be taken for the characteristic selvages of true fissure veins, but they are easily accounted for by the continuous, even if to us imperceptible, movements of the earth's crust, which elevating or depressing the earth's surface at that particular locality would inevitably occasion a gradual sliding of the rocks on each other, along such a pronounced crack in the earth's crust as this contact plane between the sedimentary rocks and the eruptive porphyry. The evidence is altogether against the theory of a fissure vein, and in favor of a secondary redeposition of the ore in place of limestone.

The sedimentary rocks of the vicinity of the mines are, beginning from above:

1. *Calcareous slate*, cropping out on the S. E. corner of the Arizona Central, on the Montezuma and Nora claims, and in other places. On the Ari-

zona Central claim, this outcrop is near the contact with porphyry, and here the seams, bedding planes, and cleavages of the slate are filled with thin layers of malachite and chrysocolla, besides showing, more removed from the surface, traces of copper glance and pyrites. The copper contents of this slate near the contact on the Arizona Central may be estimated at from 3 to 5½ per cent, hardly enough under present circumstances to be extracted with profit.

2. *A bluish limestone*, estimated at about 300 to 400 feet thickness. This is the limestone in which the contact and limestone ore-deposits have been found and worked. Below this limestone is

3. *A fine grained sandstone.* The contact zone of this sandstone and the porphyry has not been explored, none of the workings in any of the mines having reached the bottom of the limestone so far. This sandstone is of considerable thickness, about 500–600 feet. This seems to be underlaid by another layer of

4. *Limestone*, at least there is a quarry of pure limestone being worked about 1–1½ miles southeast of the Montezuma mine, by the Arizona Copper Company, on the southwest side of Chase Creek. If there is not a fault intervening between this quarry and the Montezuma mine, throwing the country around the mines at least 1000 feet above the country around the quarry, this limestone must underlie the sandstone, and if so, there is a strong probability, that a second and lower series of contact deposits may be found in the contact of this limestone with the porphyry. The quartzy nature of the sandstone prohibits the hope of finding deposits along the zone of its contact with the porphyry. A bore-hole through the sandstone would very quickly and cheaply settle the question of the existence of a lower limestone layer, and of the advisability of searching along its contact for other ore-bodies.

The ore-deposit in the porphyry, which may be found by systematic prospecting by the aid of diamond drills, will be found in the more solid mass of the porphyry to consist mainly of copper glance. This source of ore supply has, so far, been only very superficially drawn from, only those deposits having been worked whose outcrops could not fail to be noticed on the barren surface of the porphyry rock. But the frequency of the discoveries of even such accidentally outcropping deposits in that rock, make it highly probable that these deposits will yet contribute the largest amount of ore, for the reduction-works of the country.

One great advantage in this district, is the almost entire absence of water in the mines. The nearest available, being found in Chase Creek, about 1000 feet below the level of Morenci. Down to this depth, it may therefore be taken for granted, no difficulty from water will be experienced in mining. Then there is very little need of timbering. And so pronounced is the stability of the ground that it has led to absolute want of care in the timbering of some of the mines, like the Longfellow and Yankie, until at last the constant reduction of the pillars in size led to the caving of large parts of both of these mines. But it must have been a wonder to any visitor, long before these accidents occurred, how any kind of ground could stand with so little, almost no, timbering as long as it did.

Absence of the two heavy sources of expense in mining timbering, and pumping, and good and cheap Mexican mining labor, give this district many advantages. Unfortunately these are almost more than balanced by the excessive rates of freight, which bring the cost of Connellsville coke, worth $1.50 to $2 at the oven, to $30 and $35 a ton, delivered at the works. With reasonable rates of freight, this district must be one of the most flourishing mining districts in the West.

In the map published last week (Fig. 1) shows the position of the main mining claims of the district, as also the main geological features. Fig. 2 is a vertical section through the Copper Mountain mine. Fig. 3 is a vertical section through the Yankie mine. These sections will give a good idea of the nature and shape of the different kind of ore-deposits described. They are all based on actual surveys, and on notes taken during the working of the mines.

They differ somewhat from the figures given in Mr. Wendt's paper on the copper mines of the Southwest, but I can vouch for the correctness of those I have given, and I think they will bear out the theory advanced by me in this description of the mines. I will state, that I think the more extensive opening of the mines, at the time I got acquainted with them, gave me better opportunities to observe the true character of the deposits, than had Mr. Wendt when he saw them. This applies only to that part of Mr. Wendt's paper relating to the Longfellow mine. With the other mines of the Arizona Copper Company, the Coronado, Queen, and Metcalf I am not acquainted.

NOBLE, ILL., Feb. 9, 1887.

Tap Cinder.—The demand for puddlers' tap cinder, for making basic pig-iron, is still steadily on the increase. Indeed there promises to be something like a famine, after a time, of this now valuable material. Years ago, when a multitude of puddling furnaces were at work in the Cleveland district, it was produced in immense quantities, and tipped wherever there was an unoccupied plot of ground sufficiently near at hand. Hence, one of the first requisites which intending manufacturers would look out for was always a good tipping place for their puddlers' tap. Presently a small demand sprang up for making cinder pig. The Carlton Iron Company bought a good deal for this purpose, but not more than a shilling a ton was paid for it put free in trucks. Some manufacturers refused to sell at this and preferred to stock, believing that a better demand would certainly arrive some day. In one case, a heap of not less than 50,000 tons was accumulated, and is still available. When the basic process became perfected, and it was found necessary to have an excess of phosphorus in the pig, in order to provide fuel for combustion in the converter, every one naturally turned to puddlers' tap cinder as the most likely material to get it from; and so it came that the demand gradually increased, and with it the market price: until now, 4s. 6d. f.o.b. has been willingly paid. The big heap referred to is about to be systematically quarried. Others are also being opened out, and explorations made in various directions to discover heaps long neglected and almost forgotten. What will be done when all these stores are gone it is not easy to see. Basic pig must have an excess of phosphorus, or it can not safely be blown in the converter. Silicon can not be substituted without incurring considerable extra expense in calcareous additions.

GERMANY AND BIMETALLISM.

The British Foreign Office has just issued a report by Mr. G. Strachey on the question of the German currency and on the attitude generally assumed by German economists with regard to the double standard. Without throwing much new light upon this vexed, and as yet but imperfectly understood, problem, Mr. Strachey deserves credit for presenting us with an impartial and clear summary of facts, enabling us to gauge, as it were, the drift of the national opinion on the subject. He says there is a very strong desire among native financiers to maintain intact the actual monetary system, and believes there are very few, if any, of the important banking institutions throughout the empire which are not decided adherents of gold.

Of the various Chambers of Commerce, the author remarks that, "at the last Handelstag, held in March of the present year, 71 of those bodies declared for the adherence to the gold standard, and four only for bimetallism; these last were the Chambers of Dresden, Chemnitz, Münster, and Bochum. German industry is specially represented by the great association known as the 'Industrieller Verein.' The central committee recently circulated a request to the branch unions, representing the various departments of industry, to report their views on the currency question. A solitary branch announced itself as bimetallist, *sans* phrase; two branches were bimetallist with limitations, all the remainder supporting the existing currency, except three, which were in favor of an absolute gold standard. Considering the affinities of bimetallism and protection, this is a significant fact."

ANOTHER NEW BLASTING COMPOUND.

"Securite" is the name of a recent German invention for a cheap and efficient blasting powder, made from the bye-products of gas-works and coke-ovens. It is said to be more powerful than gun cotton, cheaper than dynamite, and absolutely safe, because of the uninflammability of its constituents.

It is in two forms, and the chemical composition of both may be thus described: Its first form is a mixture of dinitrobenzene or trinitrobenzene with ammonium nitrate, and its second form either dinitronaphthalene or trinitronapthalene with ammonium nitrate; and these, with their products of combustion, are expressed in the following formulæ:

$$C_6H_4(NO_2)_2 + 10NH_4NO_3 = 6CO_2 + 22H_2O + 11N_2$$

Dinitrobenzene — 12 C. Dioxide. — 44 Steam. — 22 vols. Nitrogen.

$$2C_6H_3(NO_2)_3 + 15NH_4NO_3 = 12CO_2 + 3H_2O + 30H_2O + 18N_2$$

Trinitrobenzene — 24 C. Dioxide. — 66 Steam. — 36 vols. Nitrogen.

$$C_{10}H_6(NO_2)_2 + 19NH_4NO_3 = 10CO_2 + 41H_2O + 20N_2$$

Dinitronaphthalene — 20 C. Dioxide. — 82 Steam. — 40 vols. Nitrogen.

$$2C_{10}H_5(NO_2)_3 + 33NH_4NO_3 = 20CO_2 + 36N_2 + 71H_2O$$

Trinitronaphthalene — 40 C. Dioxide. — + 72 Nitrogen. — + 142 vols. Steam.

The following data have been given by Herr Margraf, the Mines Inspector:

"The powder is granulated, of a light yellow color, with a smell like that of bitter almonds. When brought into contact with fire, it burns, and, while burning, melts, giving out a yellow flame with little smoke. This flame is extinguished when the powder ceases to be in connection with the fire. No blows ignite it, and it can only be exploded with a 1000 gramme cap, its effect being about four times as great as that of ordinary blasting powder. From a large series of tests, it has been conclusively proved that *securite* may be safely exploded in the presence of fire-damp and coal-dust, and even when used where ten per cent of fire-damp was mixed with the most dangerous coal-dust no flame appeared."

The Radiometer.—We learn that Crookes's little instrument has at last found employment! M. Frère has been making use of it for some considerable time at the gas-works of St. Quentin, in France, to determine when to put on night pressure. He takes advantage of the fact that the vanes inside of the radiometer will only turn as long as the light falling upon them is sufficiently intense: and notes the daily hour at which it ceases to revolve. He is thus able to determine the average time for lighting up and putting on night pressure for each month, and says that the results, without being *absolute*, are nevertheless very satisfactory.

Our Imports from Great Britain.—The following figures are taken from the English Board of Trade returns and show the quantities, etc., of the principal hardware, etc., goods imported into this country from the United Kingdom during February, 1887, as compared with the same month of 1886, and with the figures for January, 1887:

Article.	Month of February, 1887.	Month of February, 1886.	Month of January, 1887.
Alkali, cwt	260,386	307,684	266,661
Hardware and cutlery, value in £ sterling	25,071	25,040	32,517
IRON:			
Pig, tons	32,743	16,187	23,756
Bar, angle, rod, etc., tons	180	138	138
Railroad, all, tons	9,484	1,000	15,463
Hoops, sheets, plates, etc., tons	1,592	434	1,745
Tinplates, tons	17,256	22,086	14,485
Cast or wrought, tons	142	216	550
Old, tons	27,320	5,401	21,667
Steel unwrought, tons	28,736	2,547	16,353
Lead, all sorts, tons	50	113	16
Steam-engines, value in £ sterling	4,753	2,787	1,766
Other machinery, etc., value in £ sterling	39,763	19,376	33,585
Tin, unwrought, cwt	803	522	385
SPECIAL RETURN:			
Iron rails, tons	—	—	10
Steel rails, tons	9,137	1,000	15,213

THE NEW COMPOUND MINING PUMPS.

There are few branches of engineering science that merit and receive more attention in this country than those connected with the manufacture and improvement of deep mine pumping machinery. To such a state of comparative perfection have we, in fact, been brought by competitive skill, that it is now a matter of considerable difficulty to form preferences and remain impartial.

There is little doubt that the pump dearest and nearest to the hearts of "old school" miners is that of the "Cornish" type, nor is this surprising when we reflect upon its cheapness and simplicity, and remember how much we are indebted to it for its past and even present services.

It has frequently been shown, that an undue preference for any kind of pump, exercised without due regard to the particular work it is required to perform, is the falsest of all false policies in mining operations, and those who have blindly, or ignorantly, followed it, have always been sooner or later, compelled to "pay the piper."

The necessity for a pumping engine which, while retaining all the advantages of the "Cornish" is exempt from its well-known defects, has long been recognized by every mining engineer in every country; for our old friend is generally found to experience an inequality of strain, which results in great irregularity of speed and special liability to shocks.

The fact of its having but a single cylinder limits its beneficial expansion, which, depending upon the store of momentum in the moving mass, is proportionate to the weight in motion, multiplied by the square of the velocity. The necessary momentum depends upon the initial violence imparted to the stroke; and if we are unwilling to run the risk this violence entails, we must be content to see the engine slowly struggle against a heavy burden, and perform a vast quantity of unnecessary work.

In what is known as the *compound* pump, these drawbacks have no existence, for, while the Cornish engine, with a 10 to 1 ratio of expansion, would undergo a strain of exactly the same variation, the strain exercised in a compound pumping-engine would not be more than $2\frac{1}{2}$ to 1, and this insures a more regular rate of speed, and double amount of work.

The services rendered to the mining industry, by the well-known firm of Knowles, of New York and Boston, in the construction of improved pumping gear, have frequently been acknowledged in these columns; and it is with a pleasure commensurate to some of the difficulties we have ourselves experienced in the field, that we now call attention to their latest patented improvements, illustrated below.

Fig. 1 represents a Knowles compound condensing duplex outside-packed plunger mining pump, with 16-inch high-pressure steam cylinders, 32-inch low-pressure steam cylinders, 10-inch water plungers, and 24-inch stroke, with independent air-pump and improved form of jet condenser. It is properly proportioned for a capacity of 700 to 800 gallons of water per minute, pumped 800 feet high in a single lift.

It works without the slightest shock or jar on the connections or the column pipe.

The steam valves of both the high and low pressure steam cylinders are balanced. The steam cylinders and heads are thoroughly steam-jacketed, and every precaution is taken to insure the greatest economy.

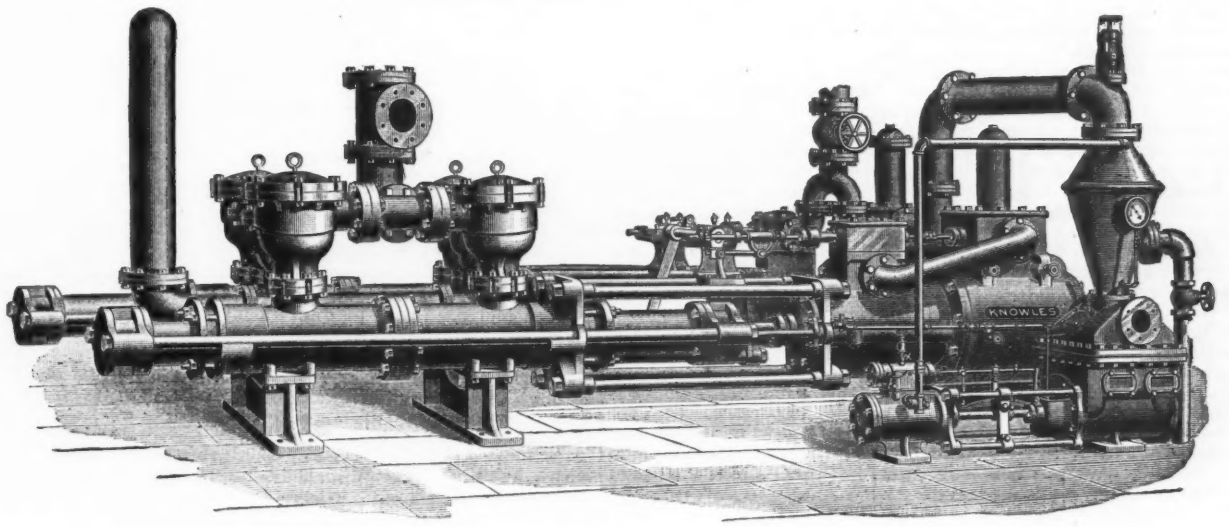

Fig. 1.

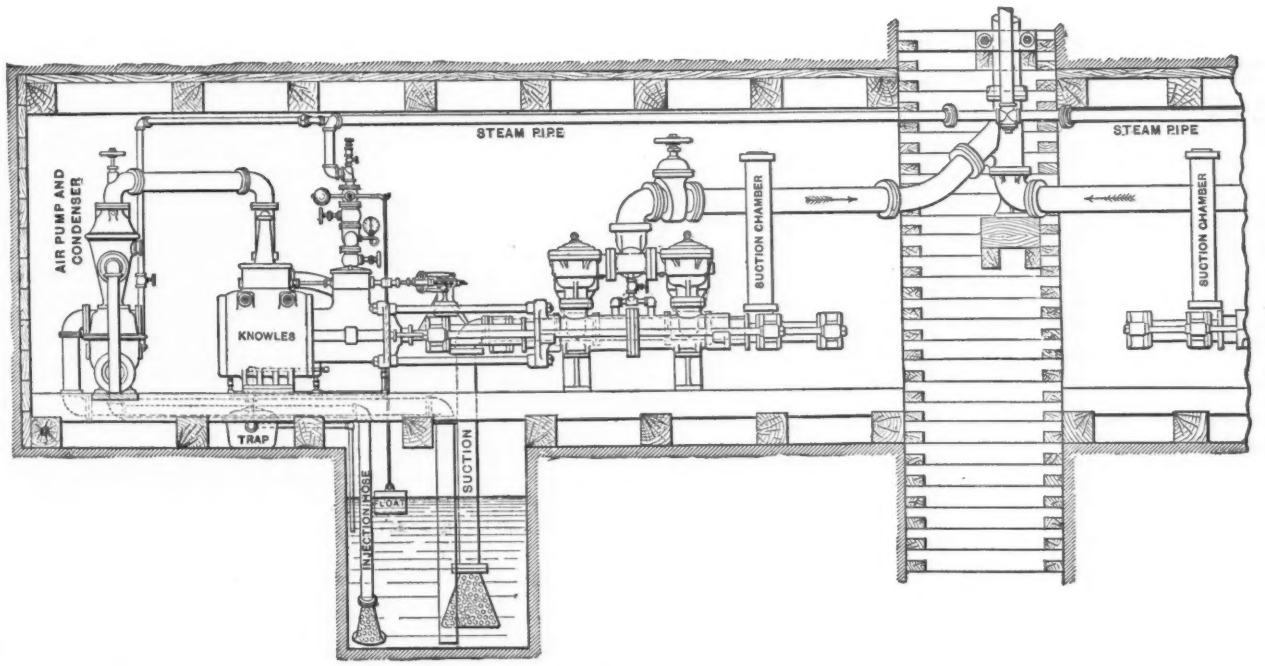

Fig. 2.

A single steam pipe in the shaft conveys all the necessary steam to run them, and when covered with good non-conducting material, does not perceptibly increase the temperature in the shaft or in the pump-station.

The air-pump and jet condenser used to condense the exhaust steam being entirely independent from the pumping engine, can be placed in any convenient location.

Fig. 2 represents the above pumping-engine placed in position, with both steam and water connections attached. As either of the duplicate pumps may be used, there is very little chance of accident from stoppage or from sudden flooding of the mine.

The supply tank is replenished by the sinking pump below, and feeds the air-pump with the necessary injection water for condensing the exhaust steam.

The warm condensed water re-enters the tank at a point where it may be at once drawn up to the surface by suction, and thus leaves the bottom sufficiently cool for condensing purposes.

Each tank is provided with a float that regulates the speed of the

engine, and by operating a balanced throttle valve on the steam supply-pipe, stops it automatically directly there is no more water.

We are informed by the makers that a large number of these pumps are now working with complete success on single lifts of over 1000 feet vertical. The valves are placed in independent chambers, or "pots," made of great strength, and are easily accessible, while every part of the entire machinery is designed for the severest work and greatest durability, even in mines where the water is strongly acid.

VALUE OF UNDEVELOPED ORE-BODIES.

There is a great fascination in the discovery of a deposit of ore in a locality where it was not previously known to exist. Such discoveries are made, as a rule, on the land of some one who lacks either the ability or the capital, usually both, to conduct a paying mining industry. And yet the fascination of discovery is so great, and mining looks so easy, that the owner of the land usually attempts to work the mine himself, with visions of wealth ahead, or if a little more experienced, attempts to "put it into shape to sell."

The usual procedure is as follows: The owner of the property starts to sink a shaft where the show is best. He spends his savings, and wants more money. Then he gets a report from the State geologist, who can always find something hopeful to say. The next step is to sell a "quarter interest" for a few hundred dollars, which is obtained from a neighbor or relative. The hole is dug larger, and water begins to bother. A small pump is bought. Soon a larger pump and a hoisting engine are wanted; but the money is gone, and there is only a small pile of ore to show for it.

Next a company is to be formed. The legal adviser draws up the papers and writes the glowing prospectus. A "controlling interest" is offered at a moderate figure to those in the same business, and is not taken.

A pushing real-estate agent or a young mining engineer visits the property, and is induced to "take hold of the matter," with a large block of stock in view as his bonus. He sells enough stock to start up again. But again more money is needed, and this time the property is mortgaged to a shrewd capitalist. Now, if the mine happens to be a very fine one and has been opened at the right place and is ably managed, and if the market is good, there is a chance for the original owner to make something. But, generally, the mortgage is foreclosed, and the shrewd man owns the property, holds it for the next "boom," and sells it at "a fair advance" to speculators (for by this time the property has some kind of a name), who turn it over to the next group of speculators, or to experienced producers, who explore it thoroughly and then work it or abandon it.

This is by no means a fanciful history. It has often happened within the observation of every one experienced in mining matters.

How many instances are known of successful working of an ore-body by the man who finds it on his own land? It would not take long to count them up.

Economics and experience both should teach that a mine has no intrinsic value. It becomes valuable only when it can be worked to a profit, or when somebody wants to buy it. It can be worked to a profit only by capital and ability. Somebody will want to buy it at a high price only when it is proved to be capable of profitable working, and high prices can very seldom be honestly obtained for undeveloped mines. The owner of such a property, unless he can control capital and ability, and special knowledge of the particular business, should be content to sell at a moderate price to those who will take the risk of development. This price will be like any other subject of barter. A shrewd man will get more than a dull one, and the price paid will be influenced by the locality, by facilities for transportation, by the character of the outcrop, and especially by the proximity and character of developed mines of the same material.

The Influence of Weather on the Proportion of Carbonic Acid in the Air.—In a very able paper read at the last meeting of the Meteorological Society, by Dr. W. Marcet, F.R.S., and M. A. Landriset, an account is given of some experiments made by the authors to determine the proportion of carbonic acid in the air at Geneva and on the summit of the "Dole," the highest point in the Jura chain, the difference in altitude being 4193 feet. The result of these experiments show: (1) that in fine, clear weather on a mountain chain of moderate Alpine altitude, and in the adjoining valley or plain, the atmosphere holds the same mean proportion of carbonic acid at both places; and (2) that when the summit of a mountain chain is in a fog, a circumstance which frequently happens in an Alpine district, the air in the fog contains a smaller proportion of carbonic acid than it would hold in fine, clear weather.

Allowances for Short Copper Assays of Chili Copper.—The following circular has been issued by Mr. Samuel J. Boyce, Secretary to the London Metal Exchange:

"I have to advise you that the directors and committee of the London Metal Exchange have resolved unanimously, and in conformity with a recommendation of a sub-committee appointed by a meeting of the copper trade generally, including consumers, dealers, and importers of Chili bar copper, that the following declarations as to the usages and alterations in the allowances for short assays of Chili bar copper landed after March 31st, 1887, and on all contracts dated after March 31st, 1887, be published: Chili bars of a produce below 93 per cent shall not be considered a valid tender upon a contract made for good ordinary brands, under the rules and regulations of the London Metal Exchange." "Should Chili bars of a lower produce than 93 per cent come forward under a contract for G.O.B's, the importers shall, at the maturity date of the contract, replace the shipment or shipments by delivering similar quantities of G.O.B's, out of stock, of any brand or brands of merchantable quality, and the buyers shall be bound to accept such substitution." "The allowance shall be continued *pro ratâ* on produces between 96 and 95 per cent., both inclusive; but the allowance for produces between 94¾ and 93, both inclusive, shall be double the *pro ratâ* from 96 per cent."

Examples of the working of the regulations as regards assays are given in *pro formâ* invoices annexed to the letter.

PRODUCTION OF SPELTER IN EUROPE AND UNITED STATES.

We have received the following statement from Messrs. Henry R. Merton & Co., London:

In tons of 2240 pounds.

COUNTRIES.	1886.	1885.	1884.	1883.	1882.	1881.
Rhine Dis. and Belgium.	129,020	129,754	129,240	123,891	119.193	110,989
Silesia	81,630	79,623	76,116	70,405	68,811	66,497
Great Britain	20,730	23,099	29,259	28,661	25,581	24,419
France and Spain	15,305	14,847	15,341	14,671	18,075	18,358*
Poland	4,145	5,019	4,164	3,733	4,400	4,000*
Austria	3,760	3,890	4,470	4,072	5,094	4 270
	254,590	256,232	258,590	246.033	241,154	228,533
United States	36,000*	34,000*	34,415	32,743	33,765	30,000*
Tons	290,590	290,232	293,005	278,776	274,919	258,533
Average price of Spelter ex ship London	£14 5s.	£14	£14 8s. 9d.	£15 6s. 6d.	£16 19s. 9d.	£16 5s. 6d.

* Estimated.

The production of spelter in the United States, according to Mr. C. Kirchhoff, Jr., agent of the United States Geological Survey, 1884 to 1886, both inclusive, is estimated as follows, the unit being the ton of 2000 pounds:

States.	1884.	1885	1886.
Illinois	17,594	19,427	21,077
Kansas	7,859	8,502	8,932
Missouri	5,230	4,677	5,870
Eastern and Southern States.	7,861	8,082	6,762
Total.	38,544	40,688	42,641

These totals are the aggregate of the returns from every works in the country, with the exception of that of the Glendale Zinc Company, whose output was estimated. The reports received indicate preparations for a further increase in the product during the current year.

The Formation of H_2O_2 by Electrolysis.—At a recent meeting of the Berlin Physical Society, Dr. Richarz said that by passing a current through diluted sulphuric acid, there was formed at the positive electrode a strongly oxidizing substance, formerly taken for peroxide of hydrogen, but demonstrated by M. Berthelot to be per-sulphuric acid, S_2O_7. In experiments on the electrolysis of concentrated solutions of sulphuric acid with wire-shaped platinum electrodes, the speaker had obtained in the solution, beside per-sulphuric acid, ozone and peroxide of hydrogen, and assumed that all three bodies made their appearance at the positive electrode. The following experiment served as a proof: A 40 per cent sulphuric acid solution was subjected to electrolysis, and thereby, on account of too great attenuation, no peroxide of hydrogen, but only per-sulphuric acid, came to view. If, now, into the 40 per cent sulphuric acid 60 per cent acid were poured, after the electrolysis was finished, then did peroxide of hydrogen show itself in the fluid.

The Export Trade of Germany.—The returns of Germany's foreign trade for January show a marked improvement in the industrial situation, as compared with the same period of 1886. The exports of iron and steel manufactures have increased from 59.715 to 67,844 tons, while the imports have fallen from 2270 to 1972 tons. The exports of rails have increased from 8453 to 16,449 tons; those of bar iron from 9638 to 15,816 tons; those of rough plate and sheet-iron from 2713 to 3421 tons; and those of rough iron goods from 4290 to 4306 tons; while the exports of pig-iron have decreased from 25,420 to 19,870 tons (the imports also decreasing); and those of iron and steel wire from 20,996 to 20,043 tons. The imports of iron ore have increased from 38,046 to 39,868 tons, and the exports have decreased from 141,562 to 132,843 tons. As to machinery, the exports of locomotives fell from 897 to 418 tons, and the imports increased from 39 to 43 tons; while the exports of machines in general increased from 4136 to 4800 tons, and the imports fell from 2133 to 1912 tons.

The exports of chloride of potash have increased from 38,046 to 39,868 tons, and the imports from 3278 to 3417 tons. The exports are still less than in January, 1882 and 1883.

The coal trade appears to be improving with the new year. The exports increased from 698,538 to 753,354 tons, though the imports also largely increased. The exports of coke increased from 46,724 to 63,235 tons.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

PATENTS GRANTED TUESDAY, MARCH 22D, 1887.

359,601. Process of Making Aluminum Chloride. William Frishmuth, Philadelphia Pa., Assignor, by direct and mesne assignments, to Rudolphe D. Montgelas, William H. Gaw, J. Hinckley Clark, Rudolph Ellis, Henry Jungerich, and George C. Potts, all of same place.
359,627. Method of Concentrating Gold. John W. Parmelee, Englewood, Ill.
359,630. Clay-Pulverizer. Granville C. Pratt, Anoka, Minn., Assignor of one half to Peter B. Morse, same place.
359,655. Brick-Machine. Benjamin J. Wilson, Atlanta, Ga.
359,659. Crushing and Grinding-Mill. William H. Bane, Gallipolis, Ohio.
359,674. Ore-Concentrator. Frederick A. Herring, Reno, Nev.
359,700. Furnace for Refining Iron. George B. Wiestling, Mont Alto, Pa.
359,703. Art of Preparing Tubes for Drawing. Winslow Allderdice, Warren, Ohio. Assignor to the Warren Tube Company, same place.
359,707. Valve for Steam Engines. William Brown, Jersey City, N. J., Assignor to himself and John McWilliams, same place.
359,720. Rock Drill Carriage. Joseph C. Githens, North Tarrytown, N. Y.
359,721. Iron Beam and Nail-Holding Device Thereof. Reinhold Goch, Zittau, Saxony, Germany, Assignor to Carl Friedrich Fürchtegott Steudtner, same place.
359,750. Stamp Mill Ore Screen. Theodore H. Trauernicht, Lead City, Dakota.
359,822. Gas-Pressure Regulator and Cut-Off. John T. Sollenberger and Horace G. Woody, Kokomo, Ind.
359,826. Sheet-Metal Vessel. Francis A. Walsh, Milwaukee, Wis.
359,835. Battery Zinc. John Beattie, Jr., Westport, Mass.
359,866. Cellular Furnace for Baking Carbons. James Hill, Cleveland, O.
359,882. Attachment for Smelting-Furnaces. Elliott R. Moffett, Jr., and Oliver R. Moffett, Joplin, Mo.
359,898. Machine for Drawing Metal Tubes. Levi F. Smith, Philadelphia, Pa.
359,910. Hoisting Machine. Daniel S. Waugh, Denver, Colorado.
359,919. Machine for Scouring Sheet Metal. John K. Chace, New York, N. Y., Assignor to J. Luther Bright, same place.
359,920. Gas Engine. Lewis T. Cornell, Chicago, Ill.
359,959. Metallic Roofing Plate or Shingle. Lewis D. Cortwright, Hyde Park, Ill., and Stephen P. Darlington, West Chester, Pa., Assignors to the Cortright Metal Roofing Company, of Pennsylvania.
359,974. Apparatus for the Production of Sound Castings. John Irwin, Jr., Edgeworth, Assignor to the Pittsburg Steel Casting Company, Pittsburg, Pa.

METALLURGY OF STEEL.[a]

By Henry M. Howe.

(*Continued from page* 206.)

The accompanying attempt to sketch the relative strength of the tendencies to form graphite, hardening and cement carbon at different temperatures, far from attempting accuracy, is necessarily conjectural. It may serve to elucidate a working hypothesis which places the facts thus far observed in an easily remembered scheme.

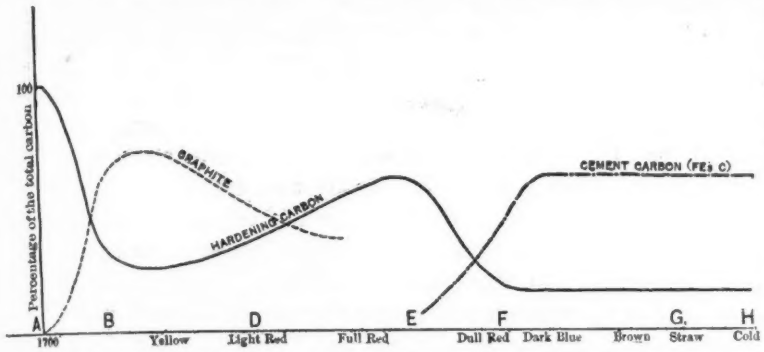

Fig 2.—Supposed influence of temperature on the relative strength of the tendencies to form graphite, hardening, and cement carbon.

In melted iron, all the carbon must be present in solution or combination, or partly in each condition. Were any of it present as graphite, it would rise to the surface on account of its lower specific gravity, and would be found concentrated there on solidification; whereas it is nearly uniformly distributed through the iron after solidifying, showing that the graphite is formed after solidification has set in. This appears to be often imperfectly understood, since we hear metallurgists speaking of the oxidation of graphite, as distinguished from combined carbon, in the Bessemer process. It is utterly inconceivable that graphite should exist as such in molten iron; indeed, it would be hard to frame definitions of chemical combination and solution which would not between them necessarily include all the carbon in molten iron; and carbon in either combination or solution can be no more properly spoken of as graphite than can the carbon in beef. If further evidence be needed, witness the way in which graphite separates from molten iron when it is supersaturated with carbon (as by the introduction of silicon); the graphite here rises to the surface of the molten metal as "kish."

§ 24. THE TENDENCY TO THE FORMATION OF GRAPHITE appears to reach a maximum at a temperature B slightly below fusion. Witness the formation of graphite when highly carbureted cast-iron is slowly cooled; that is, when it occupies a long time in passing through the range of temperature most favorable to the formation of graphite, and the conversion of white into graphitic gray cast-iron by prolonged exposure to a temperature slightly below fusion.

[Karsten indeed states that white cast-iron can only be rendered graphitic by superheating far above its melting point, with subsequent slow cooling. This is, however, opposed to common experience and to the statements of many distinguished observers. Forquignon,[b] by exposing white iron, whose carbon was wholly combined, to a temperature of about 1000 degrees C. in vacuo for several days, converted the greater part of its carbon into graphite, the total percentage of carbon being unaltered. Bell,[c] by heating white iron in a hot-blast oven for thirteen days raised its graphite from 0·374 to 1·79 per cent, the total carbon being nearly unchanged.]

The net tendency to form graphite rather than combined carbon appears to be stronger at this temperature B than at either higher or lower ones,[d] since by either raising or lowering the temperature, part of the graphite formed at temperature B may unite chemically with the iron. Thus if, after rendering cast-iron highly graphitic by prolonged exposure to a temperature somewhat below fusion, we further raise its temperature, the graphite recombines, so that by the time it is melted the carbon is again wholly combined. Whether the recombination occurs suddenly when a certain temperature is reached, or whether every increment of temperature is accompanied by a corresponding degree of recombination of carbon, is not known; but analogy points to the latter as the more probable supposition.

That this recombination occurs, at least in part, before fusion, is shown by the fact that graphitic cast-iron with but little combined carbon (the combined C in No. 1 gray iron is occasionally as low as 0·30 per cent) has a vastly lower melting point than graphiteless steel with the same percentage of combined carbon. The melting point of the iron can not be lowered by the carbon while graphitic (graphite, infusible itself, is an inert foreign body), but only on its passing into combination and thus increasing the percentage of combined carbon, which must evidently commence, in the case of a comparatively fusible cast-iron, with initially only 0·30 combined C, at a temperature far below the melting point corresponding to this degree of carburization.

On the other hand, if an iron, saturated with graphite by long exposure to temperature B, be long exposed to a somewhat lower temperature, say D, part of its graphite is changed into combined carbon.[e] Indeed wrought-iron may be carburized by long heating in contact with cast-iron or even steel, which play the rôle of the charcoal of the cementation furnace.

The passage of carbon from the graphitic to the combined state, and the reverse, comparatively rapid at elevated temperatures, becomes much slower as the temperature descends towards redness; and it is stated that it can not take place below a red heat,[f] at least in case of cast-iron.

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[a] Copy-right by the Scientific Publishing Company, 1887.

[b] *Journal of the Iron and Steel Inst.*, 1884, p. 626.

[c] "Principles of the Manufacture of Iron and Steel," p. 159.

[d] According to this view, if graphitic cast-iron, saturated with graphite by long exposure to temperature B, were suddenly cooled from B by immersion in water, it should be more graphitic than if we allowed it to cool slowly from this point, since the sudden cooling should preserve the chemical constitution and prevent the subsequent recombination of graphite. This at first seems opposed to experience, since suddenly cooling graphitic iron from even a temperature as low as B is known to lower its grade, to make it more close grained. But this objection is more apparent than real. From Bell's researches, it is probable that sudden cooling from B, while it makes the grain of the cast-iron closer nd makes it *look* less graphitic, does not diminish the amount of graphite it contains seriously, if at all.

The grade of iron is not dependent solely on its composition, but also on its rate of cooling. Witness Bell's experiment of allowing a large mass of iron to cool slowly. The interior which cooled very slowly was mottled, the edges white, while certain portions were gray; yet the percentage of both combined and graphitic carbon was practically constant throughout the block. Indeed, white iron has occasionally more graphite than No. 1 gray iron; thus Bell reports instances in which white iron had 2·2 per cent graphite, while No. 1 iron had only 2·10 per cent.

In the second place, under ordinary conditions the cast-iron cools so rapidly from the melting point to B that sufficient time is not given for the graphite-forming tendencies to completely assert themselves, so that by the time the iron is cooled down to B it is far from being saturated with graphite. Hence, in ordinary slow cooling below B, say from B to D, graphite would continue forming to a considerable further extent without reaching the somewhat lower percentage corresponding to saturation at D; while this further separation of graphite would be checked if the iron were very suddenly cooled from B.

[e] Percy: "Iron and Steel," p. 119.

[f] Akerman: *Journal of the Iron and Steel Inst.*, 1879, p. 508.

Superheating beyond the melting point indirectly favors the formation of graphite during solidification, since the superheated metal, in cooling in the mold down to the melting point, raises the temperature of its walls so that the metal after solidification cools more slowly than it otherwise would, that is, it remains for a longer time at temperatures near B. A high blast-furnace temperature also indirectly favors the formation of graphite during solidification by increasing the percentage of silicon in the cast-iron, and usually by diminishing that of sulphur. Whether at a temperature far above the melting point the chemical condition of the carbon becomes altered in a way that *directly* increases its readiness to become graphitic during solidification, *i. e.*, whether an iron melting at 1600 degrees, superheated to 2000 degrees, and again cooled to 1700 degrees before pouring into its mold, would become more graphitic on solidification than it would had it been initially cast into that same mold at 1700 degrees without previous superheating, is not clear, though it is clear from Bell's[a] experiments that this superheating in certain cases permanently raises the grade of the iron. He superheated white cast-iron far beyond its melting point: it became gray. On remelting and rapidly cooling it still remained gray.

§ 25. EFFECT OF TEMPERATURE ON THE RELATIVE PROPORTIONS OF CEMENT AND HARDENING CARBON.—We may obtain considerable information as to the distribution of carbon between the cement and hardening states at different temperatures by examining iron which has been cooled from those temperatures so suddenly as to give little time for change of chemical condition; *i. e.*, by preserving the chemical *status quo*.

In Table 2 I have condensed Abel's more important results bearing on this question. It gives the percentage of the total carbon found as Fe_3C (plus an insignificant quantity of graphite) in different steels after different treatment.

TABLE 2.—CARBON FOUND AS Fe_3C PER 100 OF TOTAL CARBON PRESENT.

CONDITION OF STEEL.	Dannemora blister steel. (C, 0·91 to 0·94; Si, 0·006, Mn, 0·9.)	Ingot steel. (C, 0·995 to 1·12).	
Annealed	87·4 to 92·8	87·5	
Unannealed	81·5 to 95·8		
Previously hardened steel tempered at a blue heat	16·1 to 31·9		
Do, after 15 minutes exposure to a blue heat		15·4 to 41·9	average 30·5
Do., after 6 hours exposure to a blue heat		42·3 to 42·9	
Do., tempered at a straw heat	33·8 to 59·2; aver. 46·5		
Do., after 15 minutes exposure to a straw heat		30·3 to 32·5	average 30·9
Do., after 6 hours exposure to a straw heat		34·2 to 36·0	
Hardened steel		4·7	

We here note that in annealed steel practically all the carbon is in the cement state, while in hardened steel hardly any of it is, from which we infer that it is in the hardening state. In tempered steel an intermediate proportion is in the cement state, and on the whole rather more in blue than in straw-tempered steel, which harmonizes with the greater softness of the former. Further, after prolonged exposure to a tempering heat, whether blue or straw, we find more cement carbon than after brief exposure, which indicates that the passage of carbon from the hardening to the cement state is not instantaneous at these temperatures.

In melted iron and steel the carbon is probably in a state closely related to hardening carbon, since on sudden cooling from fusion we find it chiefly in the hardening state.

At temperatures below fusion the tendency to form hardening carbon rapidly diminishes, as shown by the formation of graphite; but we infer that it again increases as the temperature falls below D (Fig. 2), reaching a maximum at E, again diminishing as the temperature descends to F, and below this remaining nearly constant. That it rises as the temperature falls from B to D, we infer from the gradual recombination of part of the graphite formed at B, if the iron be long exposed to D. That it reaches a maximum at E and again diminishes, we infer from the fact that steel hardened at E has all or nearly all of its carbon in the hardening state, but that if after exposing steel to a red heat we cool it to any temperature T, at or below F, so slowly that the carbon has ample time to distribute itself between the hardening and cement states in the proportions corresponding to equilibrium for T, and then suddenly cool it from T, we find its carbon in the cement state (as inferred from the fact that the steel is then almost as soft as if thoroughly annealed), no matter how violent the cooling be.

Conversely, if we quench previously annealed steel bars of identical physical properties from successively higher temperatures we find that they do not (as Chernoff has shown), become materially harder than when annealed, until a temperature F is reached; but as the quenching temperature rises above F, the resulting hardness increases abruptly, quickly reaching a maximum.

I have verified this statement experimentally by heating one end of a previously annealed steel bar to dull redness, the remainder being heated by conduction from the hot end. It was exposed for about four hours to practically uniform conditions, as all but the hot end, which was kept by a constant flame at constant temperature, was buried in lime. The bar was then quenched in a very rapid stream of water. Examining the hardness by the method of indentation, I found that the portions which had not been visibly red-hot were not appreciably harder than the cool end, which had not been materially heated (it hardly felt warm in the hand), and which was therefore still annealed.

Now if, at any temperature materially below redness, any important proportion of the carbon tended to pass into the hardening state, it would clearly have done so in some portion of my bar, since each successive portion of the bar was, immediately before quenching, exposed for hours to a temperature practically constant for each such portion, but progressively diminishing as we pass from portion to portion, and from the hot towards the cool end of the bar, and embracing every degree of temperature between redness and 70 F. On quenching, I should have found some portion of my bar harder than the annealed end; as I did not, I infer that there is no such tendency.

Slightly varying the experiment, I leisurely heated one end of a steel bar to whiteness, the remainder being heated by conduction. On quenching it, and determining its hardness by indentation, I found that where the temperature had been below F. (which is in the neighborhood

[a] *Journal of the Iron and Steel Inst.*, 1871, p. 297. Bell, however, goes too far in inferring that the quantity of graphite and combined carbon do not *affect* the grade of iron. They clearly do not exclusively control it, but it is exceedingly probable that they affect it; that is, the grade is a function of composition jointly with other variables. (Bell: "Manufacture of Iron and Steel," p. 158.)

of dull redness), the steel was not measurably harder than when annealed; but that as the quenching temperature rose above F, the hardness increased very abruptly, quickly reaching glass hardness, so that I was unable to effect any indentation with an exceedingly hard knife-edge. By carrying the pressure high enough, the glass-hard steel bar would fly violently in pieces, but without being visibly indented; the knife edge was not visibly affected.

Other phenomena indicate an important chemical change at a temperature between E and F. Iron undergoes a very sudden expansion at or in the neighborhood of this range, and its thermo-electric behavior is abnormal; moreover, "the temporary magnetism of saturated iron at this temperature suddenly vanishes from a foregoing very large value." [a]

Am I asked to reconcile the hypothesis that the carbon tends throughout the range of temperature between F (Fig. 2) and H to pass with equal completeness into the cement state with the fact that blue-tempered is softer than straw-tempered steel? I reply that, though the tendency exists throughout this range, it is held in check by what we may term chemical inertia or viscosity; that at 60 degrees this tendency is as completely checked as is the tendency of hydrogen and oxygen to combine; that when we raise the temperature and relax this viscosity the carbon does actually pass into the cement state, and the more fully the more completely we relax it; *i. e.*, the higher we raise the temperature. When we reach a straw heat, viscosity is so far relaxed that a considerable portion of the carbon previously imprisoned in the hardening state is able to pass into the cement state, and our steel is greatly softened. At a blue heat, still more of the carbon is able to overcome chemical inertia, and our steel is still farther softened, while just below visible redness, this viscosity appears to completely depart and the carbon passes wholly into the cement state. This hypothesis harmonizes with the fact that though hardened steel is softened by heating to temperatures below redness, and the more so the higher this temperature be (provided it does not exceed F.), yet annealed steel is not hardened by such heating, whether followed by sudden or slow cooling. For the softening of hardened steel by this heating means that its carbon passes into the cement state; the fact that annealed steel is not hardened by this treatment means that carbon in the cement state remains there: both point to the cement state as the one towards which the carbon tends at these temperatures.

That the transfer of carbon from the hardening to the cement state may occur at very low temperatures is suggested by the reported fact that table knives [b] gradually lose their hardness if habitually washed even in lukewarm water. It is the experience of many that razors used cold last for a greater number of years than those which are habitually heated for shaving, though for other reasons the razor while hot may cut better than when cold.

The views I have given harmonize with Jarolimek's observation that steel may be somewhat hardened by quenching from a red heat in molten zinc, which melts at 752 degrees F., but not as much as if quenched in water; while steel thus hardened is again annealed by prolonged immersion in melted zinc.

After exposing steel to temperature E, and allowing its carbon to pass completely into the hardening state, if we could cool it absolutely instantaneously we would retain all its carbon in that state; the steel would acquire its maximum theoretical hardness. Cooling can never be instantaneous; more or less carbon will pass into the cement state, towards which it tends at temperatures below F, the steel will lose something of its maximum theoretical hardness, and it will lose the more, roughly speaking, the slower this cooling be. Cooled in water, which, thanks to its low boiling point, high specific heat, conductivity, and mobility, cools the steel very suddenly, it loses very little, it acquires nearly its maximum theoretical hardness. Cooled in air, it loses much, for the air, thanks to its low specific gravity, specific heat and conductivity, cools it but slowly. Momentarily immersed in molten zinc and immediately withdrawn, and its cooling finished in air, it cools with intermediate rapidity, and hence has, when cold, an intermediate degree of hardness, because the zinc, thanks to its high specific gravity and high thermal conductivity, for an instant, though hot, withdraws heat very rapidly—more rapidly than air—from the steel, which is so much hotter. Prolonged immersion in molten zinc, however (*i.e.*, *prolonged exposure* to a temperature near F), enables the carbon to pass largely to the cement state; the steel becomes softer than after the previous momentary immersion followed by air cooling; it is softened by the very medium which had partially hardened it.

§ 26. EFFECTS OF CARBON ON THE MECHANICAL PROPERTIES OF IRON IN GENERAL.—For given proportion between the percentages of graphitic, cement, and hardening carbon, as the carbon increases the tensile strength, elastic limit, elastic ratio, and compressive strength increase within limits. The fusibility, hardness, and hardening power increase, perhaps without limit; while the malleableness and ductility, both hot and cold, and the welding power diminish, apparently without limit. The modulus of elasticity appears nearly independent of the percentage of carbon, at least within the limits C zero to C 2·00 per cent.

For reasons given in § 2, it is not to be expected that mere equality in the contained carbon would, even were the composition otherwise identical, insure like mechanical properties, nor that like changes in composition would entail like changes in these properties. Yet we might reasonably hope that, since carbon influences them so greatly, the innumerable published observations might have enabled us to determine accurately its *average* effects. Unfortunately this is far from being the case. Its average effects have been determined independently by many observers, some of whom have deduced them from very extended data. Their results are dishearteningly discordant.

§ 27. TENSILE STRENGTH.—Though we have more information on the effects of carbon, on tensile strength, than on the other properties, yet even here our results are very conflicting.

(TO BE CONTINUED.)

[a] Barus and Strouhal, "Bulletin U. S. Geological Survey," No. 14, p. 99; Tait, *Trans. Roy. Soc. Edinburgh*, XXVII., 1872-3, p. 125; Gore, *Phil. Mag.*, XXXVII., p. 59, 1869; *Ibid.*, XL., p. 170, 1870; Baur, Wie. Ann., XI., p. 408, 1880.

[b] Ledebur; "Handbuch der Eisenhuttenkunde," p. 646.

NOTE.—The publishers of the ENGINEERING AND MINING JOURNAL will thank the readers of this article if they will promptly call attention to any inaccuracies they may observe in it.

PERSONALS.

Mr. Willard Ide Pierce, Mining Engineer, has returned to this city. During the past year, he has been at the mines of the El Cristo Mining Company, U. S. of Colombia.

Prof. Pierre de P. Ricketts has just returned from West Virginia and South Maryland, where he has been making an examination of zinc, iron, and manganese deposits.

It is announced that Benton J. Hall, of Burlington, Ia., will be appointed Commissioner of Patents, to succeed Colonel M. V. Montgomery, whose resignation was tendered to the President some weeks ago.

Col. H. G. Prout, of the publishing firm of Atkin & Prout, of this city, has been appointed Managing Editor of the *Railroad Gazette*, in place of Mr. W. Howard White, resigned. We congratulate our contemporary on having secured the services of an excellent editor and able business man.

Prof. Pierre de P. Ricketts, of this city, has just returned from West Virginia and South Maryland, where has been making an examination of zinc, iron, and manganese deposits. He will start for Arizona next week, to examine the property of the Phœnix Mining Company.

FURNACE, MILL, AND FACTORY.

The large furnace at the Catoctin Iron-Works, Frederick County, Md., has again been put in blast.

The town of Orono, Me., has voted to abate taxes for five years upon any new manufacturing enterprise investing there not less than $5000.

The town of Merrimack, N. H., has voted to exempt from taxation for five years any manufacturing company that would locate there and expend $20,000 above the mill site; for $50,000, ten years.

The foundry property at Dayton, Tenn., has been sold to John H. Ferguson, former manager of Dayton Coal and Iron Company, for $1850. It will be put in operation.

The Carbon Iron Company has purchased the Fort Pitt mill, at Pittsburg, Pa., formerly conducted by Graff, Bennett & Co. It is expected that within a few months the establishment will turn out 200 tons of wrought-iron daily.

Some Pittsburgh steel manufacturers have rejected and returned to the importer a large quantity of blooms and billets recently imported from England. They rolled out well, but when they were annealed many of them were found to be so full of flaws as to be unfit for sale.

The Belmont Nail Company, Wheeling, W. Va., is repairing and remodeling their blast-furnace. It will not be enlarged, but will have all the late improvements for the most approved practice. They will also have two of Gordon's Whitwell-Cowper fire-brick stoves, 19 by 55 feet.

The Washburn & Moen Manufacturing Company of Worcester, Mass., has just issued the fifth edition of their pocket Handbook of Iron and Copper Wire in electric transmission, and the world's facts of Electric Service. The little book contains a vast amount of useful information, and parties interested in the subjects above referred to can not afford to be without it.

The Birmingham Cement Manufacturing Company has been organized at Birmingham, Ala., with a capital of $100,000, to start a new enterprise. This is the conversion of slag from the iron furnaces into cement by a new process owned by one of the incorporators. Machinery has already been bought to make some seventy barrels of cement a day, and it is proposed to have the works in operation within thirty days.

A good week's work is reported from the South Chicago plant of the North Chicago Rolling Mill Company, Chicago, Ill., for the week ending with the 19th inst. The converting department turned out 5048 gross tons of Bessemer steel ingots, the rail mill rolled 4467 gross tons of steel rails, and Furnace No. 5 made 1413 gross tons of pig-iron, exclusively from ore, on a fuel consumption of 1794 pounds of coke per ton of iron, which is the lowest economy in fuel yet attained.

Wm. Hasenzahl, Cincinnati, O., reports recent sales of his diamond bit prospecting drill, viz.: Ohio Southern Coal Co., 1 large size machine, with 1¼ inch bit; Jas. P. Harrison, Atlanta, Ga., and James T. Osier, Hamden Junction, O., both one large size, with 3¼ inch bit; H. S. Chamberlain, Chattanooga, Tenn.; G. B. Markle & Co., Jeddo, Pa., one large size, with 1¼ inch bit; and J. C. Haddock, Kingston, Pa., one small size, with 1¼ inch bit. An order has also been received from the engineer-in-chief of the mines department at Santiago, Cuba.

The mills made by the Frisbee-Lucop Mill Company, of this city, have gained a firm foothold in the phosphate trade of the South, and the following companies and firms are using these mills: The Chemical Co., of Canton; Lazeretto Phosphate Company, Patapsco Phosphate Company, P. S. Chappell & Son, Geo. W. Graflin, all of Baltimore; G. W. Scott & Co., of Atlanta, Ga.; Atlantic Phosphate Company, St. Andrews Phosphate Company, Rose Mining Company, Edisto Phosphate Company, Stono Phosphate Company, of Charleston, S. C.; Hammond, Hull & Co., Savannah, Ga.; North Carolina Phosphate Company, Raleigh, N. C.; Georgia Chemical-Works, Augusta, Ga.; and the Navassa Guano Company, Wilmington, N. C.

CONTRACTING NOTES.

CONTRACTS OPEN will be found on page xix. New Contracts this week: No. 261, Sinking Artesian Well; No. 262, Cement; No. 263, Building Bulkhead; No. 264, Dredging; No. 265, Plumbing, Steam Heating, and Steel Cells; No. 266, Skylights; No. 267, Boring and Casing a Well; No. 268, Purchase of Coal Tar; No. 269, Chemicals.

Messrs. Greene & Greene, Black's, S. C., are in the market for derricks, etc., for raising rock.

The City of Columbus, Kan., is considering the erection of water-works and an electric light plant.

The South Carolina Railway Company will build a new bridge across the Savannah River at Augusta, Ga.

The Salem Water Supply Company, Salem, N. C., has contracted with D. W. C. Carroll & Co., of Pittsburgh, Pa., for an iron reservoir 55 feet in diameter and 25 feet high.

The contracts for passenger and area elevators for the west wing of the State, War and Navy Department Building, Washington, D. C., have been awarded to Crane & Co., of Chicago, at $15,815 and $1,275.

The Mount Vernon Bridge Company, of Mount Vernon, Ohio, was awarded the contract for constructing the new aqueduct bridge across the Potomac, at Washington, D. C., at $80,905.

The Gas Trust, Philadelphia, Pa,, has authorized the Chief Engineer to ask for proposals for the laying of a twelve-inch gas main for a distance of 11,351 feet in the Twenty-second ward of that city.

The proposals of the Bethlehem Company were accompanied with a memorandum stating that the prices named were based on the conditions set out in the advertisement of August 21st last. The company adds that their bids cover both armor plate and gun forgings, and should, therefore, receive preference, all things being equal.

The Jersey City Board of Public Works has received the following bids, to construct a tunnel under the "Gap" at the foot of Washington street: J. E. Byrnes, $244,357.50; Mr. Byrnes, $1,153,840; G. F. Swift, $216,264.50. It is not generally believed, it is said, that a contract will be awarded, as there is danger of interminable lawsuits. The board demanded a million dollars security from the bidders, and this prevented many well-known contractors from bidding.

The following bids have been received by the Secretary of the Navy for 1310 tons of gun steel forgings: Cambria Iron Company, $851,513.90; Midvale Steel Company, $1,397,240; and Bethlehem Iron Company, $902,230.79.

For the steel armor plate, 4500 tons, there were but two bids, as follows: Bethlehem Iron Company, $3,610,707.50; Cleveland Rolling-Mill Company, $4,021,560.

In response to the announcement made by the Boston Water Board, Boston, Mass., published in our issue of February 12th, that a public test of water meters would be given by them, 18 concerns have signified their intention of competing. They are as follows: Balance valve, Spooner, Pierce & Freeman, Hersey, G. W. Pierce, Continental, Star and Hood, all of Boston; Barron, of Salem; Terry, of Hartford, Conn.; Union, of Worcester; Thompson, of New York; Tuerk, of Syracuse, N. Y.; Crown, of New York; Wood, of Cleveland, O.; Desper, of Worcester; and Frost, of Manchester, Eng. There are also two or three others, who have made informal requests, to be considered, and whose meters will be tested, if they desire.

LABOR AND WAGES.

The striking miners in the Peoria district of Illinois have secured possession of the Rutherford coal mine, at Wesley City, and have commenced to work it on the co-operative plan.

The open-hearth men in the Linden Steel-Works, near Pittsburg, Pa., struck for an advance in wages. This forced the skilled workmen to close also, and the entire mill was shut down.

The mills of the Delaware Iron Company, at New Castle, Del., were closed last week on account of the men refusing to go to work unless two discharged employés were reinstated. The company refused to accede to the demand.

The Shenango and Allegheny, Pa., coal miners, who struck at the beginning of the year for an advance of five per cent in wages, returned to work on the 21st. inst. at the old rate. The strike caused a suspension of work in six mines.

At a mass-meeting of the coal miners at Irwin, Pa., on the 19th inst., the compromise proposition of the Westmoreland and Pennsylvania Coal Companies to pay sixty cents per ton for mining for one year from April 1st was almost unanimously accepted.

The difficulties of the men employed by the North Chicago Rolling-Mill Company, North Chicago, Ill., have been settled by arbitration, and resulted in a concession of nearly all the demands of the men. An advance of about 9 per cent over last year's wages is granted, with time and a half while engaged in the dangerous work of cleaning flues. Extra help is to be employed corresponding to the increased capacity of the mills. The agreement is retrogressive, and will date from January 1st last.

GENERAL MINING NEWS.

ALABAMA.

JAGGER-TOWNLEY COAL AND COKE COMPANY.—This company, which has a capital stock of $400,000, has purchased about 11,000 acres of land lying on the Kansas City, Memphis & Birmingham Railroad, and on the Sheffield & Birmingham Road. The company proposes to develop this land in the near future.

JEFFERSON COUNTY.

ALABAMA-CONNELLSVILLE COAL AND COKE COMPANY.—This company has a capital of $500,000. The property is situated in Jefferson County, twenty miles from Birmingham, in what is known as the "Big Basin" of the Warrior coal-field. They have an outcrop of six easily workable veins, varying from three to fourteen feet in thickness. The property lies right along the route of the mineral arm of the Louisville & Nashville Railroad. It is the intention of the projectors of the enterprise to develop the property at the earliest possible date. They will erect 400 coke-ovens, increasing the number as rapidly as possible. Negotiations are now pending with contractors to build these ovens. The officers are: President, John F. Flournoy, of Columbus, Ga.; Vice-President, John W. Read, of Birmingham; Secretary and Treasurer, C. G. Flournoy, of Birmingham.

NORTH ALABAMA OIL AND ASPHALT COMPANY.—This company has been organized at Birmingham, with a capital stock of $1,200,000. The land owned by the company is located in Morgan and Lawrence counties, and has long been known for its oil bearing indications. The company will at once begin development work. The directors are: Messrs. W. J. Young, L. L. Halsey, J. S. Guggars, of Decatur; John C. Reid and A. V. Gardner, of Selma; and Chas. M. Erwin and Chas. Hardy, of Birmingham.

PRATT COAL AND IRON COMPANY.—The heirs of John M. and Nathaniel J. Parsons, the trackmen, who were knocked off a hand-car and killed by a coal train, near the Pratt mines, some months ago, brought suit against this company, which is now controlled by the Tennessee Coal, Iron and Railroad Company, in the City Court, at Birmingham, on the 19th inst., for $50,000 damages.

AUSTRALIA.

NEW SOUTH WALES.

Dispatches from Sydney report that eighty-five men were entombed by the explosion in the Bulli Colliery on the 23d inst. The accident occurred in a tunnel a mile and a half from the mouth of the pit. Seven bodies have been recovered. The tunnel is blocked by the *débris* caused by the explosion.

CALIFORNIA.

EXCELSIOR WATER AND MINING COMPANY.—The suit of this company, of Yuba and Nevada counties, against J. P. Peirse, was argued and submitted before Judge Wilson, at San Francisco, on the 14th inst. The suit is to recover $266,000 which defendant was charged to have caused to be paid as dividends out of the capital stock of the company and not out of the surplus profits. The defendant denied the allegations, and testified that during his régime as director he purchased, improved and added to the property of the company to the extent of nearly the same amount as that paid out in dividends.

KERN COUNTY.

SUMNER GOLD MINES, LIMITED.—This company has been organized in London with a capital stock of £100,000, shares £1 each, to purchase and work the Sumner and other gold mines, and to acquire the water rights, together with an 80-stamp gold quartz mill worked by water power, and all the other machinery and buildings now on the property.

The property consists of 12 patented or freehold blocks, covering 136.77 acres; six located mining blocks, covering 106.33 acres; and 160 acres of patented or freehold land, on which the mill and other buildings stand, making in all about 400 acres.

The mines are distant twenty-four hours from San Francisco, and when the projected extension of the Atlantic & Pacific Railway is made, there will be railway communication within five miles from the property.

The climate is mild, and all operations can be carried on during the entire year without interruption.

The vender has agreed to sell his entire interest in the concern to this company for £55,000, £25,000 cash and £30,000 in fully-paid shares, of which the vender has agreed to hold 20,000 until the 29th of September, 1888. Mr. Bell Davies, mining engineer, report upon the property confirms the vendor's statements as to the reserves of ore (over 80,000 tons), which can be readily and cheaply won as soon as the mines are reopened. He describes the lode as varying from 130 to 200 feet in width, between walls, containing three productive portions treated for convenience, as three veins, called the West Vein, Big Blue, and East Vein.

An examination of the books of Mr. Price, of San Francisco, through whose hands the bullion from 38,000 tons of quartz from these mines passed in 1880-3, showed the average to be $13.77 per ton.

Messrs. John Taylor & Sons, of London, have been secured on behalf of the company, and they will take the general management of the works.

CANADA.

PROVINCE OF ONTARIO.

HURONIAN.—Preparations are now making by this company for the resumption of work, and machinery has been shipped from New York and Chicago. It is expected the mill will start up about the 1st of May, and that chlorination works will be erected during the summer.

PEERLESS.—This company, whose property is situated near the Porcupine silver mine, is making arrangements to sink the shaft—which has now a depth of thirty-five feet—to a greater depth, and to further develop the property.

COLORADO.

COLORADO COAL AND IRON COMPANY.—The annual report for the year ended December 31, 1886, shows gross earnings of $1,926,099; operating expenses, $1,583,838; net earnings, $342,261; interest charges, $209,940; and balance, $132,321. The total output of coal was 616,410 tons, as compared with 562,660 tons, showing an increase of 53,750 tons. The production of coke was 112,176 tons; in 1885, 93,805 tons, showing an increase of 18,371 tons. The total coal shipped from all the mines was 389,373 tons; the company's consumption, 227,037 tons; the total coal shipped from all ovens was 100,556 tons. The net earnings of the coal and coke department were $285,399.77.

CHAFFEE COUNTY.

PAT MURPHY MINING COMPANY.—The stockholders propose to reorganize the company. It is now capitalized for $500,000, shares $100 each. The purpose is to increase the capitalization to $3,000,000, shares $10 each. The stockholders will receive forty-eight shares of new stock for one of the old, and the remaining 60,000 shares will be placed in the treasury and sold as may be necessary, in order to raise a working capital for the development of the mine. Should any of the stockholders desire to retain their pro rata of the treasury stock they will be permitted to do so by paying $1 per share. The Pat Murphy adjoins the Mary Murphy, and is held exclusively by St. Louis parties.

CLEAR CREEK COUNTY.

CENTENNIAL.—The sale of this mine at Georgetown for $200,000 is announced. The property is said to be well developed. The Centennial Mining Company has been organized, with a capital of $2,000,000, in 200,000 shares, one tenth paid in by Thomas A. Russell, Brandt V. B. Dixon, and Andrew J. Minard.

KOHINOOR.—This fifty-stamp mill at Fall River is being completely overhauled and repaired by Mr. J. P. Nickerson, and will run steadily hereafter, doing custom work. The mill was built several years ago, but it has never been run much. It was built for the use of the company in treating ore from the Donaldson and Champion mines. The capacity is fifty tons per day.

NEATH.—This company's mine at Empire is improving A good-sized body of ore is being developed in the lower levels. Assays of the smelting ore show values of about $100 in gold, silver, and copper. The ore finds ready sale when in the market.

CUSTER COUNTY.

SECURITY MINING AND MILLING COMPANY.—The *Rocky Mountain Review*, of Denver, has the following to say editorially in reference to this company: "In reply to many inquiries as of the value of the property and shares of the Security Mining and Milling Company, it may be stated in brief terms that the concern is rated in Colorado as a gigantic stock jobbing operation, with little or nothing to support it. This job was not, be it remembered, organized in Colorado, but in Boston, by a Boston financier, who circulates throughout New England, but never in Colorado, if it can be avoided, the most exaggerated accounts of the wealth and the production of his mines, and thereby catches thousands of customers who are anxious to become suddenly enriched by the glowing venture." Capt. J. R. de La Mar, in the course of a conversation with a representative of the *Mine, Stack, and Rail*, of Pueblo, expressed his astonishment at the remarkable success of the Security Mining Company's stock enterprises. He stated that the whole costly mill of the old Racine Boy mine, with the mines included, excepting the Racine Boy, which was already deeded to Humphrey, was bonded to him (De LaMar) for $25,000 from Keene, and, after examination, was thrown up, and then at once taken hold of by the Security people at that price. He can not understand where all the values and rich developments come from, and is still more astonished at the company's financial statements of its enormous expenditures for underground work and surface improvements. The *Mine, Stack, and Rail* gave the above information upon the special request of Capt. De LaMar, in its issue of the 9th inst.

LAKE COUNTY.

The Leadville *Herald-Democrat* reports the following:

ANTIOCH.—It is reported that this property has been sold for $150,000. It has a large body of gold-bearing ore, which, with extensive facilities for treating it without a long haul, will prove very profitable. It is situated on one of the slopes of White's Gulch, near Oro, and its ore has formerly gone to the Antioch mill.

IDEAL.—The Midnight shaft of this property is down 175 feet, 100 feet of which is submerged in water. It is stated that the machinery once in position the water can be reduced in twenty-four hours. It is supposed that the bottom of the shaft is in ore, as the surveys place the ore body within two feet of the bottom of the shaft, and the formation is the same as encountered before finding ore in other workings. When water was found in the Midnight it immediately commenced to go down in the old workings. Even if ore has been found in this shaft, it cannot be shipped much before May 1st, on account of the roads. It might have been more profitable in the end to have delayed all work until June 1st. The company has shipped about 35 tons during March.

PITKIN COUNTY.

FRANKLIN MINING COMPANY.—This company has been organized, with a capital stock of $900,000, shares $10 each, by David H. Moffat, Walter S. Cheesman, and Eben Smith. The principal office will be in Denver, the branch office in Aspen. There has also been conveyed from D. H. Moffat to the Franklin Mining Company $\frac{9}{24}$ of the Millinee, $\frac{1}{8}$ of the Franklin, $\frac{1}{6}$ of the Steele, all of the Dr. Franklin, all of the Tipperary Boy lodes, and a strip of land into which the Dr. Franklin tunnel is run, formerly surveyed as a portion of the Steele lode, and formerly conveyed by D. M. Hyman to Maurice C. Hayes, also the right, title, interest, privilege, claim, and benefit which he has under and by a certain agreement made October 13th, 1886, between J. B. Wheeler and D. H. Moffat, in so far as said agreement effects the properties above described.

PUEBLO COUNTY.

PUEBLO SMELTING AND REFINING COMPANY.—This company has been making extensive improvements in its plant at Pueblo and will start again full-handed on the first of April, by which time it is expected to have the process for the treatment of low-grade copper ores completed and in operation.

TREMONT COUNTY.

A large oil strike three miles this side of Florence is reported. The flow is said to be equal to that of any three of the wells heretofore struck.

WELD COUNTY.

ST. VRAIN.—At this mine, situated at Greeley, a nine-foot vein of coal was struck at a depth of 129 feet.

FRANCE.

Dispatches report that a fire-damp explosion occurred in the Montmartre coal mine in St. Etienne on the 20th inst. Six persons were injured.

IDAHO.

ALTURAS COUNTY.

CARRIE LEONARD MINING COMPANY.—This company has been organized at Salt Lake City, with a capital stock of $3,000,000, shares $20 each, to purchase and operate mining property in Little Smoky mining district. Seven quartz lode mining claims, situated on the divide between the head waters of Little Smoky and Carrie Leonard Creek, known as the Carrie Leonard, Pot Wrestler, Clark, Railroader, Rachael, Fraction, and Alie, together with the concentrating mill, orehouses, and all tools and supplies of every description. The incorporators are: Robert C. Chambers, Jeremiah C. Conklin, Boyd Park, Jas. O. Swift, Thos. J. Almy, and Walter Almy. The principal office will be at Salt Lake City.

PHILADELPHIA MINING AND SMELTING COMPANY.—This company, which has for the past six years struggled against all manner of adverse circumstances, and is now heavily in debt, has been incorporated in a new organization, to be known as the Philadelphia and Idaho Company, in which is consolidated all the property and interests of the Philadelphia Mining and Smelting Company, the Little Wood River Mining and Smelting Company, and various individual interests, including the Silver Star, Salamander, and other mines at Smoky, and others elsewhere in this region, upon a full paid up capitalization of $1,000,000. The new company has a cash working capital of $200,000 in its treasury, paid in and on hand to start on. Sydney L. Wright, the late vice-president and general manager of the old company, and the authorized representative of all hitherto individual interests, is the President of the new company, and H. J. Hardess will continue to superintend the affairs of the company at Ketchum as general manager.

INDIANA.

GRANT COUNTY.

MISSISSENAWA MINING COMPANY.—Reports state that this company struck the third gas well at Marion on the 17th inst.

KENTUCKY.

BRECKINRIDGE AND HANCOCK COUNTIES.

BRECKINRIDGE COMPANY, LIMITED.—Several motions were made in the Court at Louisville, on the 18th inst., in the controversy between Dr. Hugh Kennedy and the Breckinridge Company (limited). On motion by Colonel Evans, attorney for Receiver Macfarlane, $75,000 of the money now in the Kentucky National Bank was put in Macfarlane's hands to meet the ordinary operating expenses of the mines at Cloverport;

also $15,000 was set apart to meet the interest on the company's bonds due April 1, and the receiver was empowered to employ counsel to resist the suit recently brought in New York by D. L. Yeomans, of the company, for $12,000, claimed to be due on commissions.

A motion by counsel for the Breckinridge Company for the return to the company by the receiver of $5,000 advanced before the receiver was appointed, was resisted by Dr. Kennedy's counsel. The company's counsel claimed that the advance had been made to pay wages at the time when the miners and other employés were clamoring for their money, and the work was about to be stopped. They further alleged that its repayment would leave the business in as good condition as the other claimants had a right to expect the company to quit it. Dr. Kennedy's counsel claimed that this $5,000 was more than secured to the other litigants by a shipment of coal worth $6,000, mentioned in our issue of January 1st, which has been in the hands of the company in London since February 1st, and for which the company has so far failed or refused to account to the receiver. The motion was taken under advisement.

MICHIGAN.

COPPER MINES.

KEARSARGE.—At the annual meeting, the old board of directors were re-elected as follows: Messrs. J. W. Clark, Horatio Bigelow, Henry Sayles, Charles Van Brunt, and R. R. Goodell. The treasurer's report up to January 1st, 1887, showed a balance of cash assets as $73,627.45. Two shafts about 400 feet apart are now down to the third level of the mine, and communication at the second level between them has been nearly made. A letter from the superintendent, dated the 11th inst., states that the lode has been cut at the third level north of No. 2 shaft. Some three feet in width is exposed, and this affords some barrel work and good stamp rock. The stuff broken is of healthy character, and in a mine more fully developed could only be regarded as most flattering. Both the drifts in the second level between Nos. 1 and 2 shafts have very much improved in the last twenty feet drifted, and apparently they both have encountered the same bunch of copper. In two days, from one and a half to two tons of barrel work have been broken in these openings. No mine in the region affords copper rock of better character than we find here. Copper is invariable heavy, and the mineral is easy to dress up to a high percentage.

GOGEBIC RANGE.

COLBY.—The boarding house of this iron mine at Bessemer was destroyed by fire on the 23d inst., and twelve persons were burned to death.

IRON MINES.

CLEVELAND IRON COMPANY.—The diamand drill which has been operated in a quiet way by this company at Lake Angeline during the winter has revealed the presence of that which promises to develop into a hematite mine of considerable magnitude. Operations to test the ground under the lake were begun last summer, when a shaft was put down, some 80 feet, at a point on the north shore close to the water's edge, when work was discontinued until the water in the lake was sufficiently frozen so a drill could be sustained by the ice, when two holes were bored into the lake's bottom at a distance of a couple of hundred feet from the north bank of the body of water. Over the first hole is 32 feet of water, over the second 37 feet The vein struck dips at an angle of 50 degrees south, and has a width, as can be well judged from the drill borings already made of 50 feet, measuring at right angles to the walls. Assays made of the ore show it to contain 64·36 per cent. of metallic iron. The company owns a stretch of land under the lake of some 2,600 feet in length, and taking in the entire width of the body of water, while the Lake Superior company owns the land covered by the water to the west of them.

LAKE SUPERIOR.—The work of sinking the shaft by this company on its lands immediately adjoining the Detroit mine on the west is now fairly under way. The company will no doubt share in the benefits derived from the finding of ore by the Cleveland Iron Company under the water of Lake Angeline, they possessing the western end of the lake.

MISSOURI.

WESTERN GAS AND COAL COMPANY.—This company has been organized with a capital stock of $500,000: incorporators, E. C. Rice, C. O. Godfrey, and W. E. Beckwith.

RANDOLPH COUNTY.

RANDOLPH COAL, GAS AND MANUFACTURING COMPANY.—The contract to bore for coal and gas in Randolph bottoms has been closed by the company with the Diamond Prospecting Company, of Chicago, which has agreed to begin boring on the 4th of April, under penalty of forfeiture of $50 for every day's delay after that date. The holes will be sunk at least 1200 feet. The Randolph Company has assurance that several large manufacturing companies will locate in Randolph bottoms should coal or gas be found in paying quantities.

MONTANA.

DEER LODGE COUNTY.

WEST GRANITE.—A report says that a well-defined vein has been struck and that the ore runs forty to sixty ounces. There has been quite a boom in this stock for the last two weeks.

JEFFERSON DOUNTY,

GREGORY CONSOLIDATED.—Messrs. Seligman & Co. bankers, of New York City, have just taken judgment, against this company for $65,000. This was the amount which they advanced a short time ago to secure the release of A. J. Seligman, the son of Jesse Seligman, who was held by the miners as a hostage for the payment of their wages, which event was mentioned in the ENGINEERING AND MINING JOURNAL of January 29th and February 12th, and created great excitement at the time it occurred.

LEGAL TENDER.—This mine, near Clancy, has been closed down. The pumps were pulled up, and all material of value used in the levels taken out. It looks as though the abandonment of the property was final. The property has been worked a number of years, and has yielded a great deal of rich ore. The property is principally owned by Hauser & Holter.

LEWIS & CLARKE COUNTY.

EMPIRE.—The report of the directors from the date of the formation of the company to December 31st last, says: the accounts show a balance upon net revenue account, after placing £1000 to a reserve fund, amounting to £7383 11s. 1d., and thus the net earnings of the company for the 5⅙ months since milling commenced are equal to about 16⅓ per cent per annum. The directors propose to recommend a dividend of 1s. 4d. per share. This will absorb £6666 13s. 4d., leaving a balance of £716 17s. 9d. to be carried forward to the credit of the current year. It is proposed to amend article 95 by striking out the words "not exceeding 5 per cent," so as to remove all question as to the power of the directors to pay interim dividends to any amount they may consider advisable in the company's interest.

SILVER BOW COUNTY.

AMY & SILVERSMITH.—The report presented at the annual meeting held at Butte, last week, shows that the company's assets to March 1st amounted to: cash in the treasury, $64,113.18; plant and permanent improvements, $29,138.24; supplies on hand, $2240; total, $95,491.42. The average of the value in gold and silver of the ore sold from the center vein from the apex of the chute down to the 400-foot level net of the cost of reduction was so far $91, and on the north vein net $25 per ton.

On the south vein, which has just been tapped on the 200-foot level, there has been no ore extracted. The stopes on the north vein have produced quite largely of second-class ore, and show large quantities in sight above the 200. This ledge has but recently been cut on the 300-foot level. The center vein is mostly worked out down to the 400-foot level, and to continue operations on it for more than two months will necessitate the sinking of the main shaft to the 500-foot level, and this is recommended by the manager. As to the south vein, just cut on the 200-foot level, it will be necessary to cross-cut to it on the 300 and 400-foot levels some time during the year. This vein is a continuation of the Moulton center vein, and has been their main producer. Within our ground we have never explored it. There are in addition two other veins lying north of all the workings, and within the side lines yet entirely unexplored and even unexamined. The development work on the north and south veins so far progressed that the management do not deem it necessary to keep so long a surplus in the treasury, and assume that with safety a five cent per share dividend might be resumed in the near future.

NEVADA.

EUREKA COUNTY.

STAR MINING AND SMELTING COMPANY.—This company has been organized, with a capital stock of $150,000, shares at $10 each. The principal place of business will be at Union. The incorporators are: La Mott Porter, S. W. Martin, G. M. Winwood, David Lindsay, and Joseph Lindsay.

STOREY COUNTY—COMSTOCK LODE.

We condense the following from the Virginia City *Chronicle*:

ANDES.—Ore of the average milling grade is being raised to the surface, extracted from the 200 level. The 300 level is being opened to explore the downward extension of the ore development on the level above.

BALTIMORE.—West drifts have been started on the 225, 450 and 550 levels. Ore has been cut in drifting on the 550 level, which is said to assay high. This development is undoubtedly the downward extension of the vein exposed on the 450 level.

BULLION.—The Crœsus shaft will shortly be reopened down to the 300 level, when the old drifts on that level will be reopened up to a point where ore was passed by 20 years ago, when nothing that assayed below $100 a ton was considered worthy of attention. Two west cross-cuts will be sent into west Potosi ground on the 300 level. The east drift on the 200 level is out 350 feet from the station, showing clay, and quartz giving low assays throughout its entire length. This drift will be extended to cut the southern and downward extension of the ore development made on the 250 (tunnel level) in Potosi.

CONSOLIDATED CALIFORNIA & VIRGINIA.—The official report for the week ended the 12th inst., shows that during the week 983 tons of ore were shipped to the Morgan mill, 1534 tons to the Eureka mill. The average assay value of all the ore worked at both the above mills during the week, according to battery samples, was $35.02.

Bullion valued at $75,271.76 was shipped to San Francisco on the 7th inst., and $62,857.94 on the 14th inst.

GOULD & CURRY.—On the 300-level from the uprise, the face of the west cross-cut is in the old stopes, exposing ore in small quantities. The face of an east cross-cut opposite to the west cross-cut, mentioned above, is in porphyry showing streaks of quartz.

IOWA.—An air-shaft is being sunk in the middle lode to connect the tunnel with the surface, for the double purpose of ventilation and prospecting the vein, which shows free gold in the surface croppings. A vein of gold-bearing quartz, said to be 25 feet in width, lying on a heavy clay foot-wall, was cut into last week in extending tunnel B. A south drift is being sent out along this vein, and will be extended under the surface croppings.

OCCIDENTAL.—In the upper tunnel the west cross-cut No. 2 from the south drift shows streaks of ore carrying value.

POTOSI.—With the exception of extending south lateral drifts Nos. 1 and 2 along the vein on the 250 level, operations are suspended until the Sharon shaft is sunk down to the 300 level to facilitate operations in the mine.

SEGREGATED BELCHER.—It is stated that the Sutro Tunnel Company has entered a protest against the listing of this company's stock at the San Francisco Stock Exchange. That the tunnel company hold a sheriff's deed to the property, and has ample proof that more than the annual amount of holding work required by the U. S. mining statute has been performed by the winze through a drift run through the tunnel level. The Superintendent of the Sutro Tunnel Company authorizes the statement that the tunnel company will bring suit to quiet title and prevent by force, if necessary, any attempt of the company to take possession of the mine. In our last issue we referred to the organization of the Segregated Belcher Mining Company.

YELLOW JACKET.—Explorations above the 900 level demonstrate the existence of a vast belt of low-grade ore, extending upward to the grass roots.

NEW YORK.

WYOMING COUNTY.

WARSAW SALT COMPANY.—A fire on the 20th inst. destroyed the packing house, storehouse, refining mill, boiler and engine house, with the office, at this company's works, at Warsaw. The derrick of the old salt well was also burned, with the pump and machinery. The loss on buildings and machinery is estimated at $100,000 and on the stock $20,000. The company had the most complete works in the new salt field.

NORTH CAROLINA.

CATAWBA COUNTY.

SHUFORD.—The company has decided to sink a new shaft to a depth of about 300 or 400 feet.

This action has been taken after mature deliberation and a patient investigation of the reports submitted by the superintendent.

UNION COUNTY.

HOWIE.—Work at this mine is being pushed vigorously. They are using the "Wiswell mill," and intend to put in another mill of this kind in a short time.

WARREN COUNTY.

RANSOM BRIDGE.—It is reported that this placer mine has been sold to English capitalists recently for $150,000.

PENNSYLVANIA.

COAL.

An explosion of gas in the Standard coal mines at Mount Pleasant, at noon on the 19th inst., blew the covering off the mouth of the old shaft, and injured two miners. The explosion occurred in that portion of the mine which was recently burned out. There was no other damage done, and the mine is still in operation.

INDEPENDENT GAS AND OIL COMPANY.—The gas well struck by this company near Sewickley, as mentioned in our issue of the 12th inst., has been tested, and showed a pressure of 340 pounds in one minute, and 650 pounds in three minutes. The well will be sold shortly to one of the companies which are piping the valley.

REDSTONE COAL AND COKE COMPANY.—The old Redstone Coal Company has been reorganized and has taken out a new charter under the name of the Redstone Coal and Coke Company, with a capital of $500,000. The members are: Jacob E. Ridgway, Dr. W. K. Brown, and George W. Leuffer, of Philadelphia; James McKay, of Pittsburgh; A. L. McFarland and F. Z. Shellenberger, of Westmoreland County; J. H. Bowman, of Waverly, Iowa; S. S. Graham, of Brownsville, Pa.; and the trustees of the estate of Adam Jacobs, deceased. The company owns 4000 acres of coal on Redstone Creek, a short distance from Brownsville, and will this summer open a mine and build coke-works.

NATURAL GAS.

The assessment of the pipe lines owned by the several natural gas companies in Pittsburgh is as follows: Philadelphia Company, $1,038,161; Chartiers Company, $!97,881; People's Company, $146,997; Manufacturers' Company, $56,640; Pennsylvania Company, $119,699; Washington Company, $19,748. The taxes on this assessment will aggregate $62,162.72 for the present year. The total pipeage in the city is nearly 200 miles, on which the valuation aggregates $1,579,126.

CHARTIERS NATURAL GAS COMPANY.—George W. Cook and wife entered suit on the 22d inst. against this company to recover $5000 damages. The plaintiff says the gas company ran a line of pipe through the yard of his house in Murrysville and failed to properly fill up the trench, and in consequence his wife fell and was seriously injured.

SOUTHWEST NATURAL GAS COMPANY.—The company began to lay its first pipe on the 18th inst. on the line to run from Grapeville, through the coke country, to Uniontown.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to March 19th:

	1887. Gallons.	1886. Gallons.
From Boston	1,083,470	630,310
Philadelphia	24,954,542	23,160,939
Baltimore	1,595,139	2,601,622
Perth Amboy	2,925,500	718,086
New York	72,452,684	80,215,264
Total exports	103,011,335	107,326,221

TEXAS.

The stockholders of the Forth Worth Western Railroad Company have decided to bond the road for $15,000 per mile, and a sufficient number of bonds will be issued to build the line to the rich coal-fields in Jack and Young counties.

PALO PINTO COUNTY.

GORDON COAL MINING AND OIL COMPANY.—This company has been organized, with a capital stock of $50,000, and is now engaged principally in getting control of such lands as it will probably need. The officers are: C. Thornton, of Gordon, President; Jasper N. Haney, of Weatherford, Vice-President; A. Jamison, of Gordon, Treasurer; and R. H. Rogan, of Gordon, Secretary.

UTAH.

JUAB COUNTY.

BULLION-BECK & CALIFORNIA MINING COMPANY.—This company has been organized at San Francisco, with a capital stock of $10,000,000, to work the Bullion-Beck and Champion group of mines in Tinctic District. The directors are: George C. Perkns, W. H. Brown, J. A. Fillmore, Cornelius O'Connor and Alex. Badlam.

SALT LAKE COUNTY.

YOSEMITE No. 2 MINING COMPANY.—This company has been organized, with a capital stock of $1,000,000, shares $10 each. The officers are W. C. Staines, President; James Glendenning, Vice-President and Treasurer; and C. L. Haines, Secretary. The principal office will be at Salt Lake City. The company proposes to operate the Yosemite No. 2 mining claim, situated in West Mountain mining district.

SUMMIT COUNTY.

CRESCENT.—By next May, the winze will be far enough down and other preliminaries ready to receive and put in operation the following machinery: One No. 10 Burleigh air-compressor, one pair 100 horse-power double-drum hoisting engines, one pair of 54 × 16 steel boilers, two 48 × 16 air receivers, a No. 7 Llewellyn filter heater and condenser, 1200 feet of wire rope, 2200 feet 7-inch air pipe, etc., etc. After this plant gets in working order, says the Park City *Record*, the mine can be advantageously worked and the high-grade ore economically extracted.

DALY.—It is understood that dividends will not be resumed until after the new machinery gets into working order.

SOUTHERN TIER.—This company is doing development work on its property. The No. 1 shaft from No. 2 tunnel level is down forty feet on the vein, ore all the way. The No. 3 shaft on No. 2 tunnel level is down ninety feet on the vein, or 290 feet below the surface. The vein at the bottom of the shaft is 2½ feet wide, and the ore is high-grade. Considerable ore is being taken out and piled on the dump in readiness for shipment when the roads open in the spring.

WEST VIRGINIA.

KANAWHA COUNTY.

COAL RIVER MINING AND LUMBER COMPANY.—This company has been organized, with a capital stock of $764,000. It owns large tracts of timber and coal lands in this county. The Kanawha & Ohio Railroad has decided to extend the road in West Virginia to Mercer County.

WISCONSIN.

EAU CLAIRE BLACK PINE MINING COMPANY.—This company has been organized at Eau Claire with a capital stock of $500,000. The officers are: President, Joseph Leincnkugle; Vice-President, Frank Alder; Secretary, William Range; Treasurer, F. Woltersdorf.

NEWBERRY IRON MINING COMPANY.—This company has been organized at Milwaukee with a capital stock of $255,000, by J. M. Home, C. H. Degroat, Jr., and C. R. Lenthrop, of Milwaukee.

ST. CROIX COUNTY.

CRESCENT LAND AND MINING COMPANY.—This company has been organized at Eau Claire, with a capital stock of $1,000,000, shares $25 each, by E. Horan, George H. Daniels, E. E. Stanton, Thomas Powell, and Albert Steinfelt. The company intends to place a large force at work prospecting and developing its newly acquired iron lands in Dunn and St. Croix counties.

HECLA IRON MINING COMPANY.—This company has been organized, with a capital stock of $1,000,000, shares $25 each, principal place of business in St. Paul, with a branch office at Ashland. The general nature of the business is to be the purchasing of iron mines, mining, shipping, smelting, and selling ores of the same, and manufacturing iron. The officers are: F. M. Morris, President; Charles A. Greeley, Charles B. Walker, Vice-Presidents; Henry Overholser, Secretary and Treasurer; Barney Hoppenyon, General Manager.

ST. CROIX MINING COMPANY.—This company, which has a capital of $2,500,000, has purchased 5000 acres of mineral lands. At a meeting of the stockholders, held at Eau Claire last week, it was decided to declare all the stock not paid in forfeited.

WYOMING.

TREMONT COUNTY.

CARISA GOLD MINING COMPANY.—This company's property, situated in Shoshone mining district, is said to be developed to such an extent that a ten-stamp mill will have enough ore to run for several years. The present mill can not be used to advantage, and the company proposes to erect another and larger mill, and for this purpose offers working capital stock for sale. For particulars see our advertising columns.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, March 25th.

Statistics.

Production Anthracite Coal for week ended March 19th, and year from January 1st:

TONS OF 2240 LBS.	1887. Week.	1887. Year.	1886. Week.	1886. Year.
P. & Read. RR. Co.	144,167	1,577,655	199,418	2,027,516
Cent. R. R. of N. J.	99,179	874,136	*	*
L. V. RR. Co.	153,802	1,413,608	121,147	1,299,232
D., L. & W. RR. Co.	108,246	1,100,433	109,331	1,198,213
D. & H. Canal Co.	64,181	981,801	70,547	885,907
Penna. RR.	58,140	561,710	70,347	698,804
Penna. Coal Co.	28,502	248,821	18,422	230,019
Total	656,217	6,758,164	589,212	6,361,579
Increase	67,005	396,585		
Decrease				

* Included in tonnage of Philadelphia and Reading R. R.

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1882	4,897,703	1884	4,903,580
1883	5,616,217	1885	4,917,054

Production of Coke on line of Pennsylvania RR. for week ended March 19th, and year from January 1st:

Tons of 2000 pounds.

	1887. Week.	1887. Year.	1886. Week.	1886. Year.
Tyrone & Clearfield	...	1,700	.....	.....
Allegnany Region.	4,976	54,686	3,616	40,725
West Penn. RR.	2,577	24,844	1,906	19,690
Southwest Penn. RR	63,728	722,188	55,199	380,306
Penn. & W. Region	7,925	81,439	6,386	74,368
Monongahela	1,809	36,012	3,300	16,348
Pittsburg Region.	.....	.....	.....	.....
Snow-Shoe	1,125	11,307	946	9,064
Total	82,140	932,176	71,353	540,501

Production Bituminous Coal for week ended March 19th, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1887. Week.	1887. Year.	1886. Week.	1886. Year.
Phila. & Erie RR.	.....	.....	24	407
**Cumberland, Md.*	62,933	525,218	1,332	369,633
Barclay, Pa.	3,702	55,117	3,166	45,338
**Broad Top, Pa.*				
H. & Broad Top RR.	10,433	95,671	3,798	63,585
East Broad Top	.....	.....	.....	.....
Clearfield Region, Pa.				
Snow Shoe	4,118	40,082	3,172	34,098
Karthaus (Keating)	3,563	42,964	5,252	30,389
Tyrone & Clearfield	64,547	642,349	2,583	538,418
Alleghany Region, Pa.				
Gallitzin & Mountain	16,528	199,130	12,270	139,352
Pocahontas Flat Top Coal.				
Norf'k & West. RR.	22,754	250,989	16,405	157,165
Kanawha Region, W. Va.				
Ches. & Ohio RR.	†27,000	317,008	†25,000	267,285
Total	215,578	2,238,528	73,002	1,645,670

* Tons of 2240 lbs. † Estimated.

WESTERN SHIPMENTS.

Pittsburg Region, Pa.				
West Penn RR.	7,004	73,177	6,276	53,652
SouthwestPenn. RR.	3,769	36,063	3,519	25,882
Pennsylvania RR.	4,321	51,633	2,142	44,655
Westmoreland Region, Pa.				
Pennsylvania RR.	33,598	329,657	15,580	288,250
Monongahela Region, Pa.				
Pennsylvania RR.	5,084	75,534	5,387	39,715
Total	53,776	566,064	32,904	452,154
Grand total	269,354	2,804,592	105,906	2,097,824

Anthracite.

Among producers representing but a small proportion of the entire output of anthracite coal, there is a weakness shown, while the large producers are, without exception, very firm in their ideas that prices can, and will, be maintained this year. The demand for coal at present is small. This is largely due to the fact that most buyers believe that the usual spring reduction in prices will be made; and, as a consequence, they are buying as little as possible. On the other hand, an uncertainty as to just what tolls would be demanded by the railroads has prevented individual producers from selling coal to arrive after April 5th. Again, the necessity of a revision of tolls in the East, upon inland shipments, has disturbed business in that quarter. The best authorities in the trade express, with much confidence, the opinion that this will be a very satisfactory year both as to the quantity of business to be done, and as to the prices to be obtained. At the same time, they think that the situation will require nursing at times, and the utmost confidence in the final outcome. It is recognized that the present moment is one for heroic measures. The most important matter is to keep the production within proper limits. Opinions differ as to what it should be for

next month. Some think it should not exceed 2,000,000 tons, and others that the trade will take 2,500,000 tons. Conservative opinion favors 2,250,000 tons as an outside quantity.

The indications are that for a time the market will look heavy, and under a dull trade a few thousand tons sold at reduced prices will be exaggerated until they look like mountains. From all that can be seen at present, we think that buyers will do well to avail of any opportunities that may offer during the next 30 to 60 days. A small amount of coal is accumulating upon the shipping wharves, but is very small as compared with what is coming to market. We do not think that the accumulations will be at all alarming during the next two months if the gentlemen who advise the trade as to the possible requirements of the market keep upon the safe side. At all events, there is good stocking ground at present, and we think it will pay the shippers well to stand the cost of stocking. It will be made up before the end of the year if it results in maintaining prices.

The Delaware and Hudson Canal Company will probably name Rondout prices next week.

The Lehigh & Wilkes-Barre Coal Company is ahead in its shipments this month fully 10,000 tons, as compared with the same month in any previous year.

The general sales agents have been invited to visit the Coal Exchange on Tuesday. Incidentally this will afford another opportunity to discuss the trade conditions. Separately these gentlemen express the opinion that it will be unnecessary to reduce prices. We do not look for any special developments at the coming meeting.

The small sizes of coal are very scarce, and the prices for them are quite firm. Stove and the larger sizes are easier.

We quote ordinary free burning coal, net f.o.b., as follows:

Lump	$3 40@.....
Steamboat	3.40@.....
Broken	3.40@.....
Egg	3.50@ 3.65
Stove	3.90@ 4.00
Chestnut	4.00@.....
Pea	2.85@ 3.00
Buckwheat	2.00@ 2 50
Dust	1.40@ 1 50

We hear of Lehigh Stove as low as $3.75 per ton, f.o.b.

Bituminous.

The bituminous producers have named prices as follows: F. o. b. Philadelphia, Baltimore, Norfolk, and Newport News, $2.50 per ton for railroad contracts and $2.60 for other business; alongside New York, $3.50; and f. o. b. New York harbor for points east of Hell Gate and above the towing limits on the North River, $3.10 per ton. These prices are so conservative that many of the producers are dissatisfied, and it is quite probable that a further advance of 15 to 25 cents per ton will be made if the workings of the pool justify it. The prices named afford but little relief to the producers, who share very liberally with the miners and the railroad companies. We hear of two large contracts closed, which will aggregate over 125,000 tons at full rates. The indications are that a very large amount of business will be done during the next two weeks. Spot coal is selling at from 15 to 25 cents per ton above the established rates, and there is none offering. In fact, the transportation facilities do not permit the shippers to meet their old orders. At Baltimore, vessels are scarce. The rates are as follows: To Boston, $1.25; to New York, $1.10; to Sound ports, $1.15. These rates are not likely to be maintained. At Philadelphia, the rates are: To Boston, $1.15; to Sound ports, $1.05; and to New York, 90 cents.

Boston. March 24

[From our Special Correspondent.]

The retailers here are making but slight demands, and the market for anthracite is consequently dull. It seems also to be a shade easier, as usual, owing to the outside operators. Not only hard white ash stove, but free burning white ash is being offered as from New York, at concessions from circular, quoting hard at $3.85@$3.95 f. o. b., and free burning at $4. The companies are nominally holding to $4.15, but the amount of business done on that basis is very small. The small sizes of anthracite are still in meagre supply, and prices for New England trade at least are little better than nominal on pea and buckwheat. Nut coal can be had at $4 f. o. b. Egg is steady at $3 70@$3.80, and Broken at $3.55@$3.65.

Bituminous coal is without movement, but when the new prices are put around the market will be more active. There is a rumor of an advance on June 1st from $2.50@$2.75, but jobbers take little stock in such a proposal. Coal has been selling in a small way at $2.40@$2.50, on lots deliverable by April 1st.

The weakness in freight rates continues marked, and minimum rates easily prevail. There is still considerable delay in all New York ports, unless, perhaps, at Hoboken, where affairs are in a better shape.

We quote, exclusive of discharging: New York, 85@95c.; Philadelphia, $1.05; Baltimore, $1.25@$1.35; Newport News and Norfolk, $1.05@$1.10.

As predicted, retailers have reduced quotations to consumers upon arrival of recently bought coal, and we quote as follows: White Ash Stove, $6@$6.25; Egg, $5.75@$6; Broken, $5.50@$5.75; Franklin, $7.50@$7.75—all above are delivered prices.

Buffalo. March 24.

[From our Special Correspondent.]

The anthracite and bituminous coal trade presents on the surface no new features; what is below is known only to those within the inner chamber or *sanctum sanctorum*. President Cleveland has appointed the Inter-State Commerce Commissioners, and their ideas and action are anxiously awaited by all who use the railroads, and by none more eagerly than our coal merchants. One thing is certain, in whatever way the Commissioners decide the freight question, increased activity may be expected, as the wholesale coal business has been dull and movement curtailed in consequence of the uncertainty of the interpretation of the clauses of the bill. The wholesalers and miners' part of the question once decided, the retail portion becomes an easy matter for settlement.

The coke trade without change; firm tone to market.

Transportation facilities are expected to be more liberal the coming season, in consequence of the increase of gondola and box cars by building and repairing.

Glad to see "Occasional" has woke up; his letter bears the mark of the pen of a man within the *sanctum sanctorum!*

The coal shippers of Buffalo have been notified that a general advance in freight rates may be expected next month. The price of coal at the mines will probably remain as at present. The effect upon the coal producer who has no railroad backing will remain to be seen. The rebate in freight rates has been in many instances the whole profits accruing to the miners.

Several vessels have commenced loading here with coal for upper lake ports; no price named, the charters made out "at opening rates."

The end of March is at hand, and with the cold weather experienced for some days the prospects of an early opening of navigation has disappeared. The fishermen report that where the ice is not piled it is from six to twelve inches thick. Activity, however, prevails among the vesselmen and ship carpenters, engineers are looking after machinery, and captains and masters are on hand engaged in securing crews and making all preliminary arrangements for sailing. The upper part of Lake Erie is blocked again with floating ice, which has caused a suspension of navigation between Cleveland and Detroit, etc.

The last news from the Straits of Mackinaw is as follows: "Ice from 20 to 24 inches thick. It is sound and blue and somewhat heavier and thicker than it was this time last year. The winds have been easterly most of the time, cold and raw. Unless a material change sets in, there is nothing to indicate an early opening—say about April 21st.

On March 22d, the Assembly at Albany passed the Canal Appropriation Bill by a vote of 84 to 37. It now goes to the Governor for signature.

Cleveland.

At the final meeting of the coal operators of the Hocking Valley and Pittsburg region and the shippers of this vicinity, held at Cleveland on the 18th inst., it was agreed that the Pittsburg men may charge 25 cents a ton more for coal free on board at Cleveland than that charged by the Hocking Valley operators, provided arrangements can be made with the railroad companies by which the freight rates can be adjusted. A year ago, the Hocking Valley operators sold manufacturers coal at $1.65 a ton on board vessels at Lake Erie ports. They now propose selling at $2.15 and $2.25 a ton free on board at Cleveland, which would make the price of Pittsburg coal under the proposition $2.25 and 2.50.

Pittsburg. March 24.

[From our Special Correspondent.]

The coal market continues dull, prices weak, not quotably lower here. At Cincinnati prices declined ½ cent, which failed to improve the demand. There has been no further coal shipments, water in the Ohio not being sufficient. Boats that left on the last rise are returning to empties that will be loaded for the first rise.

The current rates for coal afloat at the tipples, based on the present mining rates, are: First pool, per 100 bushels, $4.50; second pool, $4.25 per 100 bushels; third pool, $3.62½; and fourth pool, $3.

Railroad, $4.50@$5 per 100 bushels.

Connellsville Coke.—The agreement between the coke syndicate and the Producers' Association has been renewed for three years from April, instead of for one year, as formerly. An equal distribution of cars, and representation at all meetings, are guaranteed to the Producers' Association.

Coke.—The current rates are as follows: Blast-Furnaces, $2 f.o.b. cars at ovens; Foundry, $2.30; Crushed, $2.60.

Freights westward are as follows: From the ovens to Pittsburg, 88 cents a ton; to the Mahoning and Shenango valleys at Wheeling, $1.65; and to Chicago, $3.30.

FREIGHTS.

The latest actual charters to March 25th, per ton of 2240 pounds:

To	From Philadelphia	From Baltimore.	From New York shipping ports.
Baltimore	.60§	.....	.....
Bath, Me	1.25*	1.25	.85*
Beverly	.85	.....	.....
Boston, Mass	1.00@1.25*	1.25	.85*
Bridgeport, Conn	.....	1.15	.70
Bristol	.....	1.25	.....
Brooklyn	.....	1.10	.....
Cambridge, Mass	1.05*	.....	85* 3c.
Cambridgeport	1.25*	.....	85* 3c.
Charleston, S. C	90@1.10	1.25	.....
Charlestown	1.05*	.....	.85*
Chelsea	1.05*	.....	.85*
Com. Pt., Mass	1.05*	.....	.83*
E. Boston	1.25*	.....	.85*
East Cambridge	1.25*	.....	85* 3c.
E. Gr'nwich, R. I	.....	.....	.....
Fall River	.....	1.15	.....
Galveston	.....	3.00	.....
Georgetown, D.C	1.10	.....	.....
Gloucester	1.10*	.....	.....
New Bedford	1.00	1.15	80@85
Newburyport	.....	.....	1 00*
New Haven	.....	1.15	.70
New London	.....	1.15	.75
Newport	.75@.80	.....	.....
New York	.90§	1.10	.25§
Norfolk, Va	.90	.....	.....
Norwich	.....	.....	.75@.80
Norwalk, Conn	.....	.....	.70
Portland, Me	1.25*	1.25	.85*
Portsmouth, N.H	.....	1.35	.95*
Providence, R. I	1.00@1.05*	1.15	...
Quincyport	.....	1.35	.....
Richmond, Va	.70	.....	.....
Roxbury, Mass	1.05@1.25*	.....	.....
Salem, Mass	1.05@1.25*	1.25	.83*
Savannah	1.90	1.00	.....
Somerset	.....	1.15	.....
Washington	1.10	.....	.....
Williamsb'g, N.Y	.....	1.10	.....
Wilmington, N.C	.....	1.00	.....

* And discharging. † And discharging and towing. 3c. per bridge extra. § Alongside. ‖ And towing up and down. ¶ And towing. †† Pilotage. ** Below bridge. *** Old B. L.

MARKETS.

NEW YORK, Friday Evening, March 25.

Prices of Silver per ounce troy.

Mar	Sterling exchange	Lond'n Pence.	N. Y. Cents	Mar	Sterling exchange	Lond'n Pence.	N. Y. Cents
19	4.86	45¼	98¼	23	4.87	44¾	97¼
21	4.86⅛	45⅛	98	24	4.87	44¾	97¼
22	4.86⅛	45	97¼	25	4 87½	44¾	97½

Indian buyers have been holding off, but market closes with better feeling.

Within the last ten days the New York assay office has received 50,657 troy ounces, or two tons of trade dollars. They had been received at the sub-treasury for redemption since the passage of the act providing for their retirement. About 100,000 of the dollars are made into silver bricks and piled up in the bullion room of the assay office every day. They do not add very much to the pile of $60,000,000 worth of bullion already deposited there.

Foreign Bank Statements.—The governors of the Bank of England, at their weekly meeting, reduced the minimum rate of discount from 3½ to 3 per cent. During the week, the bank gained £637,000 bullion, and the proportion of its reserve to its liabilities was raised from 48·84 to 49·55 per cent, against 41⅞ per cent at the same time last year. On the 24th inst., the bank gained on balance £60,000 bullion. The

weekly statement of the Bank of France shows a loss of 7,200,000 francs gold, and a gain of 3,125,000 francs silver.

The Metal Exchange.

Copper.—The market has been weak and dull, but closes a shade firmer. There have been no large sales from first hands. Calumet & Hecla and other standard Lake brands are held at 10·55 cents for spot, with 10·45 cents bid. Sales in second hands are reported at 10·50 cents. Lake companies are offering at 10·60 cents for June delivery, and 10·65 cents July. Standard Lake is getting scarce in second hands.

Baltimore and Orford companies brands are quoted at 9¼ cents, with little business doing.

Chili Bars closed to-day at £39 15s., a considerable advance on last week's quotation.

The English market seems firmer, in spite of the perennial Anaconda rumors on the other side. Balfour, Williamson & Co. are offering 200 tons of Anaconda matte, recently arrived in Liverpool, at 8s. 1½d., with 7s. 9d. bid.

We have seen cables to-day stating that Balfour is negotiating for a time contract with English smelters, under which he offers them 700 tons of Anaconda monthly. We learn here that in addition to the 300 tons monthly (3000 tons) of argentiferous copper matte sold through James Lewis & Son, to which we referred on March 12th, freight has been engaged for 800 tons of matte monthly for Liverpool—undoubtedly Anaconda. Considering the situation at Butte in connection with this rumor in England we presume Mr. Haggin is offering 300 tons monthly on the other side. The reduction of the English estimate by over one half is only a fair allowance to make on any statements concerning Anaconda which emanate from the English market.

We learn that the Canadian Copper Company, of Sudbury, have commenced regular shipments of their pyrites to acid men and others in the United States, which will be largely increased next summer, and that the shipments on arrival are found to assay from 7 per cent to 12 per cent copper and 2 per cent to 5 per cent nickel. With freights from Sudbury to New York at $5.50, we are likely to see considerable of these pyrites brought forward.

Dullness in the export trade in copper still continues. The following are the only shipments.

All were to Liverpool, viz.:

Copper matte, 484 tons	$52,400
" bars, 203,725 lbs	19,632

Tin.—Cables to-day to the Metal Exchange report sales of 130 tons on a quiet market with Spot Straits quoted at £102 7s. 6d., and three months, £102 17s. 6d. The Exchange quotes 22·65c. for prompt Straits or Malacca, up to 22·70c. for August. Prices at the Straits are very firm, with an advancing tendency.

Lead.—This metal has fallen into a rut, and neither buyers nor sellers care to pull it out. The bidding is slack and listless at 4·25@4·30c. White lead is offered for delivery over 60 days at 4·35@4⅜c., but these apparently low prices do not tempt the consumers, and not a single transaction of any volume has been recorded during the week.

Mr. C. Kirchhoff, Jr., agent for the Division of Mineral Statistics of the United States Geological Survey, has issued the following statement of the production: As compared with former years, the production of lead in the United States in 1886 was as follows, in short tons of 2000 pounds.

	1884.	1885.	1886.
Desilverized lead	119,965	107,437	114,829
Non-argentiferous lead	19,932	21,975	20,800
Total	139,897	129,412	135,629

The total given under "Desilverized Lead" is the aggregate of the returns of every desilverizing works in the country. The quantity of "Non-Argentiferous Lead" is for 1886, the estimate made by Messrs. John Wahl & Co., of St. Louis, of which they state 13,800 tons are the output of Southeast Missouri, and 7000 tons are the product of the Southwest Missouri and Kansas district. A considerable increase in the make is expected during the current year from the former section.

Messrs. Everett & Post, of Chicago, telegraph as follows to-day: The market remains about the same—if any thing, a shade weaker, 4·25c. asked, 4·20c. bid. No business to test actual values. Offerings are very light. Refiners, anticipating better prices, have withdrawn from the market at present, and refuse to make sales for future delivery at present prices.

Messrs. John Wahl & Co., of St. Louis, telegraph to-day as follows: Market does not reveal any activity, but, on the other hand, shows no sign of weakness, holders having quite frequent inquiries for small lots, maintaining prices fairly well. No particular features have arisen during the past week; prices seem to have touched bottom, and are firmer at the current quotations. Sales have been light, probably not aggregating 300 tons, at prices ranging from 4·17½@4·20c.

Spelter.—The London market by cable advices to-day quotes £14 2s. 6d. for Silesian. We quote 4·40@4·80c., according to brand, and 6½@7c. for New Jersey.

New Jersey Zinc Oxide, 4@4½c., according to grade.

Antimony.—Cables to the Metal Exchange to-day quote Hallett's at £30 10s. The market here remains at 7⅝c. for Hallett's and 9½c. for Cookson's.

Quicksilver.—There is no change to report. We quote $42 per flask, and 52½@53c. per pound; in London, £7 per flask.

Nickel.—We quote 65@67½c. per pound.

Aluminium—Is quoted at 90c.@$1 an ounce.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, March 25.

American Pig.—There is no change to note, the market remaining firm and quiet. Quotations for Standard brands are $21@$22 for No. 1 X; and $20@$21 for No. 2 X. Forge, $18.50@$19.

Scotch Pig.—The dullness continues with small importations. We quote: Coltness, $22.50@$23; Dalmellington and Clyde, $20.50@$21; Summerlee, $22@$22.25; Eglinton, $20@$20.50.

Cables to-day to the Metal Exchange quote: Coltness, 55s. 6d.; Langloan, 52s.; Summerlee, 54s. 6d.; Gartsherrie, 49s. 6d.; Glengarnock, 48s. 6d.; Dalmellington, 46s. 6d; Eglinton, 44s. 3d.

Bessemer Pig remains dull and very weak. We quote $20.25@$20.50 for Foreign.

Spiegeleisen.—Foreign 20 per cent is quoted $27@$27.75, with no business.

Steel Blooms and Billets.—There is nothing worthy of note in the market. Prices continue at from $30@$30.50 for Rail Blooms. Billets, $32@$33, according to size and quality. Nail Slabs, $32@$32.50. American Charcoal Blooms, from $54@$56. Scrap Blooms, $36@$37.

Steel Rails.—We continue to quote $39@$40 at Eastern mills for heavy sections, and $44.50@$45 for light sections, with a few small sales. The inquiries on the market will foot up nearly 100,000 tons. There is every indication of a good demand through the year, with some prospect of increased importations.

Structural Iron and Steel.—The mills are busy delivering orders, and are expecting further demands. There is a tendency to stiffer prices. We quote: Bridge Plate, 2·4@2·5c.; Angles, 2·3@2·4c.; Tees, 2·7@2·8c.; Steel Angles, 2·6@2¾c., all from mill. Beams and Channels, 3·3c., base from dock.

Steel Plates.—A very good business is doing. Quotations for delivery on wharf at New York are: Tank and Ship Plates, 2·9@3·1c.; Shell, 3¼@3½c.; Flange, 3½@3¾c.; Fire-Box, 4@4½c.

Merchant Steel.—The market is unchanged, and quotations remain, according to quantities: American Tool Steel, 7½@10c.; special qualities, 11@20c.; Crucible Machinery, 4@4·5c.; Bessemer and Open-Hearth Machinery and Spring, 2·7@3c.; Sleigh Shoe, 2·4c.; Open-Hearth and Bessemer Cutlery, 3·2c.

Plate Iron.—There is not much business in this market. We quote: Common Tank, 2·45@2·55c.; Refined, 2·5@2·6c.; Shell, 2·7@2·8c.; Flange, 3·7@3·8c.; Extra Flange, 4¼@4½c.

Bar Iron.—A large business is doing. For Refined we quote 2·1@2·2c., base price at mill; for Common, 2@2·1c.

Cast-Iron Pipe.—The foundries are busy, with quotations remaining at $30@$37 for 36-inch and 4-inch.

Rail Fastenings.—We quote: Spikes, 2·60@2·75c. per pound, delivered, and 2·60c. at mill. Angle Fish-Bars, 2¼c.; Bolts and Nuts, 3·2c. for square, and 3·4c. for hexagonal.

Scrap Iron continues as before, with Foreign quoted at $23, and Choice Yard $25.

Old Rails.—There has been an attempt to enliven the general dullness of the iron market by talking about old rails. The bears have done most of the talking, and there have been some forced sales at low prices. Tees are quoted $22@23., and Double-Heads all the way from $22@$24.

Louisville. March 23.

[Reported by GEORGE H. HULL & Co.]

The buying of pig-iron this week has been very limited. Freight rates are still unsettled and unsatisfactory. Consumers seem to keep out of the market longer than we anticipated. Furnaces have accumulated little stock, and are firm in their quotations, excepting on round lots, for which they are willing to make slight concessions. There are no new features to report, and there has been no change in the market for the past five weeks.

We quote for cash as below:

PIG-IRON.

Southern Coke, No. 1 Foundry	$21.50@$22.00
" " No. 2 "	20.50@ 21.00
" " No. 2½ "	20.00@ 20.50
Hanging Rock Coke, No. 1 Foundry	21.00@ 21.50
Southern Charcoal, No. 1 Foundry	22.00@ 23.00
Silver Gray, different grades	20.00@ 20.50
Southern Coke, No. 1 Mill, Neutral	19.50@ 20.00
" " No. 2 " "	19.50@ 20.00
" " No. 1 Mill, Cold Short	19.00@ 19.50
" Charcoal, No. 1 Mill	20.50@ 21.00
White and Mottled, different grades	17 50@ 18.50
Southern Car-Wheel, Standard Brands	26.00@ 27.00
" " Other "	24.00@ 25.00
Hanging Rock, Cold-Blast	27.00@ 28.00
" " Warm-Blast	23.00@ 24.00

Philadelphia. March 25.

From our Special Correspondent.

Business in all kinds of iron and steel is dragging in comparison to what it was a month ago. A few transactions took place this week, which, viewed by themselves, might warrant the statement that prices are not so strong. The existing dullness has its legitimate causes, and they must exhaust themselves before real improvement can take place. A multitude of inquiries have been made, particularly for crude iron, and offers for large lots, for second quarter's delivery, were submitted at $20.50 to $22, according to brand and quality. The agents of the large companies are bent on meeting only actual requirements, unless their own prices are paid. The rolling-mills everywhere are crowded full of orders, but many will be completed by April 15th, and hence there are several parties looking up forge iron supplies, though not with such an urgency as presages higher prices. No. 1 Foundry in the lower grades is weaker. A few days will determine the course of a few large consumers of forge iron. The movement of foreign material is increasing. Among several arrivals were 16,637 steel blooms, 16,128 slabs, 632 steel billets, 500 tons pig-iron, and 2000 pieces old rails. Several other lots are nearly due. Rail blooms are dull, and Bessemer pig, though under inquiry, is slow of sale. Muck bar capacity continues well sold up at steady prices. Anthracite blooms report no diminution of orders. Merchant iron makers speak of some decline of activity, but say the orders on hand are sufficient to carry them over two or three weeks of dullness. Nails, under the present policy of restriction, are selling at rates quoted. Heavy building operations will set in early next month. Plate and tank iron has dropped two tenths, and buyers even at that do not seem anxious to cover any more than pressing demands. Skelp iron production has never to seek buyers, and wrought-iron pipe makers have fresh inquiries this week and higher quotations are hinted at. Sheet iron of all kinds is coming into more active demand. Several large engineering requirements calling for upwards of thirty thousand tons of structural, plate, pipe, cast, and sheet iron will shortly be heard of. The steel rail situation remains unchanged. The accumulated orders now foot up 1,500,000 tons. Old rails sell at $25 for Tees. Buyers refuse to place orders at present. Scrap is firm and scarcer.

CARD RATES.

	$		$
Foundry No. 1	21.50@22.50	Muck-Bars	33.50@34.00
Foundry No. 2	19.50@20 00	Merchant Iron	2@2.30c.
Gray Forge	18.50@19.50	Plate Iron	2.35@ .....
Bessemer Pig	20.50@21.50	Tank Iron	2 30@ .....
Foreign material:		Skelp Iron	2.20@ .....
Steel Rail Bl'ms	30.00@31.00	*Structural iron:*	
Foreign Bess'r	21.00@22.00	Angles	2.25@ ..
Speigeleisen	27.50@28.00	B'ms and Chan	3 30@ .....
Scrap, Selected	24.50@	Nails	2.50@ .....
No. 1	24 00@	Steel Rails	39.50@41.00
Cargo Scrap	23.50@	Old Rails	23.50@25 00

Pittsburg. March 24.

[From our Special Correspondent.]

The market since our last has undergone a slight change, and that change was in favor of buyers, generally speaking. Pig-iron is valued about 25 cents a ton below prices that were current a short time since. This has been brought about by buyers holding out for lower figures, being enabled to do this on account of the unusually large sales that were consumated—beginning last fall and continuing until a short time since. As usual, a wide difference of opin-

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied to date.	Assessments. Date and amount per share of last.	Dividends. Total paid to date.	Dividends. Date and amount per share of last.
1	Adams, s. L	Colo.	$1,500,000	150,000	$10	*		$555,000	Jan. 1887 10
2	Alice, s. C	Mont	10,000,000	400,000	25	*		750,000	Sept 1886 .06¼
3	Amie Con., s. L	Colo.	5,000,000	500,000	10	*		330,000	Oct. 1883 .05
4	Amy & Silversmith, s.	Mon.		341,419				264,852	Dec. 1886 .10
5	Atlantic, c	Mich	1,000,000	40,000	25	$280,000	Apl. 1875 $1.00	360,000	Jan. 1887 $1.00
6	Argenta, s	Nev.	10,000,000	100,000	100	295,000	July 1885 .10	40,000	Feb. 1880 .20
7	Aurora, i	Mich	1,000,000	40,000	25			40,000	Apl. 1887 1.00
8	Barbee & Walker, s.	Utah	1,000,000	100,000	10	*		60,000	Nov 1880 .10
9	Bassick, G. S	Colo.	10,000,000	100,000	100	*		400,000	Mar. 1884 1.00
10	Belle Isle, S	Nev.	10,000,000	100,000	100	160,000	Feb 1887 .20	300,000	Dec. 1879 .25
11	Belcher, G. S	Nev.	10,400,000	104,000	100	2,217,335	Dec. 1885 .80	15,397,000	Apl. 1876 1.00
12	Bellevue Idaho, S. L.	Idah.	1,250,000	125,000	10	26,250	Dec. 1883 .10	200,000	Jan 1887 .10
13	Big B'nd Hydraulic, G	Dak.	1,000,000	200,000	5	*		223,000	Mar. 1887 .03
14	Black Bear, G	Cal.	3,000,000	30,000	100	22,500	Dec. 1884 .25	895,000	May 1883 .20
15	Bodie Con., G. S	Cal.	10,000,000	100,000	100	374,990	Jan. 1887 .50	1,602,572	Apl. 1885 .50
16	Bonanza Developm't	C & M	3,000,000	300,000	10			135,000	Oct. 1882 .15
17	Bonanza K'g, Cons.	Cal.	1,000,000	100,000	10	*		185,000	Feb. 1885 .10
18	Boston & Mont, G	Mont	2,500,000	250,000	10	*		520,000	Jun 1886 .15
19	Breece, s	Colo.	5,000,000	200,000	25	*		2,000	Feb. 1880 .01
20	Brooklyn Lead, L. S	Utah	500,000	50,000	10			102,000	Sept 1886 .05
21	Bulwer, G	Cal	1,000,000	100,000	10	40,000	Oct. 1885 .20	175,000	Jan. 1884 .10
22	Caledonia, G	Dak.	10,000,000	100,000	100	505,000	May 1885 .15	40,000	Feb. 1886 .10
23	Calumet & Hecla, C	Mich	2,500,000	100,000	25	1,200,000		28,850,000	Mar. 1887 5.00
24	Carbonate Hill, S. L.	Colo.	2,000,000	200,000	10	*		80,000	Apl. 1884 .05
25	Caribou Con., S	Colo.	1,500,000	150,000	10	*		50,000	Mch 1880 .10
26	Castle Creek, G	Idah.	100,000	100,000	1			51,000	Oct. 1883 .03
27	Catalpa, S. L	Colo.	3,000,000	300,000	10	*		270,000	May. 1884 .10
28	Central, C	Mich	500,000	20,000	25	100,000	Sept 1861 .06	1,820,000	Feb 1887 2.00
29	Christy, S	Utah	10,000,000	100,000	100			10,000	Jun. 1885 .10
30	Chrysolite, S. L.	Colo.	10,000,000	200,000	50			1,660,000	Dec. 1884 .25
31	Colorado Central, S. L	Colo.	2,750,000	275,000	10	*		193,750	Apl 1887 .05
32	Cons. Cal. & Va., G. S	Nev.,	21,600,000	216,000	100	108,000	Jan. 1885 .20	388,000	Mar 1887 .50
33	Con. Gold Mining, G.	Ga...	500,000	100,000	5	*		108,000	Nov. 1883 02
34	Contention, S	Ariz.	12,500,000	250,000	50			+2,587,000	Dec. 1884 .25
35	Crescent, S. L. G	Utah	15,000,000	600,000	25	‡		210,000	Aug. 1886 .05
36	Crown Point, G. S	Nev.	10,000,000	100,000	100	2,875,000	Feb. 1882 .25	11,588,000	Jan. 1875 2.00
37	Daly, S. L	Utah		150,000				75,000	Feb. 1887 .50
38	Deadwood-Terra, G	Dak.	5,000,000	200,000	25	*		$900,000	Jan. 1884 .10
39	Derbec B. Grav., G. S.	Cal.	10,000,000	100,000	100	90,000	Dec. 1881 .10	140,000	Jun. 1886 .10
40	Dunkin, S. L	Colo.	5,000,000	200,000	25	*		220,000	Sept 1884 .05
41	Elkhorn, G. S	Mont	1,000,000	100,000	10	50,000	July 1883 .50	165,000	Mar 1887 .05
42	Eureka Con., G. S. L.	Nev.,	5,000,000	50,000	100	500,000	July 1886 1.00	4,817,500	July 1882 .25
43	Evening Star, S. L	Colo.	500,000	30,000	10	*		1,400,000	Nov 1883 .50
44	Excelsior, G	Cal.	10,000,000	100,000	100	580,000	Sept 1885 1.00	875,000	Oct. 1880 .25
45	Father de Smet, G.	Dak.	10,000,000	100 000	100	200,000	Nov 1878 1.00	1,125,000	Dec. 1885 .20
46	Franklin, C	Mich	1,000,000	40,000	25	220,000	Jun. 1871	550,000	Dec. 1886 1.00
47	Freeland, G. S. C	Colo.	5,000,000	200,000	25	*		190,000	July 1886 .10
48	Fresno Enterprise, G	Cal..	5,000,000	100,000	50		Mch 1883 .10	110,000	July 1882 .10
49	Garfield Lt., G. S	Nev.	500,000	100,000	5			12,000	Dec. 1883 .12
50	Gould & Curry, G. S.	Nev.,	10,800,000	108,000	100	1,100,000	Mar. 1887 .50	3,826,000	Oct. 1870 10.00
51	Grand Central, S	Ariz.	1,000,000	100,000	10			625,000	Dec. 1882 .25
52	Grand Prize, S	Nev.,	10,000,000	100,000	100	570,000	Apl. 1886 .50	495,000	Mar. 1884 .25
53	Granite, S	Colo.	125,000	125,000	1			6,250	May 1883 .01
54	Granite Mountain, S.	Mont	10,000,000	400,000	25	*		1,900,000	Mar 1887 .25
55	Green Mountain, G	Cal..	1,250,000	125,000	10	*		212,000	Nov. 1881 .07½
56	Hale & Norcross, G. S	Nev.,	11,200,000	112,000	100	5,030,300	Mar. 1887 .50	1,598,000	Apl. 1871 5.00
57	Hall-Anderson, G	N. S.,	150,000	150,000	1			7,000	Jan. 1882 05
58	Hecla Con., S. G. L. C.	Mont	1,500,000	30,000	50	*		1,122,000	Jan. 1887 .50
59	Hel'a Mg & Red, G. S. L	Mont	3,315,000	663,000	5	*		197,970	July 1886 .06
60	Holmes, S	Nev.,	10,000,000	100,000	100	300,000	Sept 1885 10	75,000	Apl. 1886 .25
61	Holyoke, G	Idah.	200,000	200,000	1			27,000	Feb. 1883 .10
62	Homestake, G	Dak.	12,500,000	125,000	100	900,000	July 1878 1.00	3,763,750	Mar. 1887 .20
63	Honorine, S. L	Utah	500,000	250,000	2	25,000	Jun. 1883	87,500	Dec. 1886 .05
64	Hope, S	Mont	400,000	8,000	50	*		158,252	Oct. 1884 1.50
65	Horn-Silver, S. L	Utah	10,000,000	400,000	25	*		4,000,000	Nov. 1884 .50
66	Idaho, G	Cal..	310,000	3,100	100			3,750,000	Jun. 1886 7.50
67	Ideal, S. L	Colo.	1,500,000	150,000	10	*		15,000	Oct. 1886 .05
68	Illinois, S	N. M.	100,000	100,000	1	*		25,000	Jan 1887 .25
69	Independence, S	Nev.,	10,000,000	100,000	100	340,000	Oct. 1886 .20	225,000	Sept 1879 .25
70	Indian Queen, S	Nev.,	250,000	125,000	2			368,750	July 1883 .03
71	Invo, G	Cal..	500,000	100,000	5	*		45,000	Apl. 1882 .05
72	Iron Hill, S	Dak.	2,500,000	250,000	10	82,500	Oct. 1885	112,500	Oct. 1886 .05
73	Iron-Silver, S. L	Colo.	10,000,000	500,000	50	*		1,900,000	Mar. 1887 .20
74	Jackson, G. S	Nev.	5,000,000	50,000	100	10,000	Nov. 1880 .20	45,000	Oct. 1886 .10
75	Jocuistita, S	Mex.	2,500,000	250,000	10			1,200,000	Feb. 1885 .50
76	Kentuck	Nev.,	3,000,000	30,000	100	342,000	Nov 1881 .30	1,600,000	Dec. 1886 .10
77	La Plata, S. L	Colo	2,000,000	200,000	10	*		610,000	Sept 1882 .30
78	Leadville Cons., S. L.	Colo.	4,000,000	400,000	10	*		410,000	Oct. 1886 .05
79	Lexington, G. S	Mont	4,000,000	40,000	100	*		565,000	Jan. 1885 2.00
80	Little Chief, S. L	Colo.	10,000,000	200,000	50	*		780,000	Mch 1885 .10
81	Little Pittsburg, S. L	Colo.	20,000,000	200,000	100	*		1,050,000	Mch. 1880 .50
82	Manhattan, S	Nev.	5,000,000	50,000	100	250,000	Mar. 1887 1.00	437,500	Feb 1886 .25
83	Marguerite, G	Cal..	500,000	25,000	20			18,750	Oct. 1882 .25
84	Marion Bullion, G	N. C	500,000					15,000	Jan 1886
85	Martin White, S	Nev.,	10,000,000	100,000	100	1,150,000	Mar. 1886 25	140,000	Dec. 1886 .25
86	Mary Murphy, G. S	Colo.	350,000	3,500	100	*		52,500	Mar. 1887 5.00
87	Minnesota, C	Mich	1,000,000	40,000	25	420,000	Apl. 1886 1 00	1,820,000	Mar. 1876
88	Mono, G	Colo.	5,000,000	5,000	100	50,000	Jun. 1885 .50	12,500	Mar 1886 .25
89	Montana, Lt., G. S	Mont	3,300,000	330,000	10	*		999,900	Jan. 1887 .02
90	Morning Star, S. L	Colo.	1,000,000	100,000	10			675,000	Dec. 1886 .25
91	Moulton, S. G	Mont	2,000,000	400,000	5	*		320,000	Dec 1886 .07½
92	Mount Pleasant, G	Cal.	150,000	150,000	1	*		150,000	Feb 1887 .30
93	Mt. Diablo, S	Nev.	5,000,000	50,000	100	137,500	Jun. 1880 2.00	80,000	July 1885 .20
94	Napa, Q	Cal..	700,000	100,000	7			290,000	Jan. 1883 .10
95	Navajo, G. S	Nev.,	10,000,000	100,000	100	450,000	Mar. 1887 30	325,000	Feb. 1885 .25
96	N. Hoover Hill, G. S.	N. C.	800,000	120,000	2½	*		30,000	Dec. 1885 .06½
97	New York Hill, G	Cal..	5,000,000	50,000	100	62,500	Oct. 1885 .15	215,000	Aug. 1882 .10
98	Northern Belle, S	Nev.,	5,000,000	50,000	100	425,000	Jan. 1884 8.30	2,400,000	Apl. 1883 50
99	North Belle Isle, S	Nev.,	10,000,000	100,000	100	250,000	Mar 1887 .50	30,000	Aug. 1881 .15
100	Ontario, S. L	Utah	15,000,000	150,000	100			8,150,000	Mar. 1887 .50
101	Ophir, G. S	Nev.,	10,000,000	100,000	100	4,007,800	Dec. 1886 .50	1,595,000	July 1882 1.00
102	Original, S. C	Mont	1,500,000	60,000	25	*		114,000	Oct. 1884 .05
103	Osceola, C	Mich	1,250,000	50,000	25	480,000	Apl. 1876 1.60	1,022,500	Jan. 1887 1 00
104	Oxford, G	N. S.	125,000	125,000	1	*		34,500	Oct. 1885 .02
105	Paradise Valley, G. S	Nev.	10,000,000	100,000	100	47,000	Mar. 1882 .15	140,000	Nov 1886 .10
106	Peacock, S. G. C	N.M.	2,000,000	200,000	10	*		60,000	Nov. 1886
107	Pleasant Valley, G. S.	Cal..	10,000,000	100,000	100	40,000	Mar. 1884 .10	30,000	Dec. 1882 .05
108	Plutus, G. S. C. L	Colo.	2,000,000	200,000	10	*		20,000	Feb. 1886 .10
109	Plymouth Con., G	Cal..	5,000,000	100,000	50	*		1,925,000	Apl. 1887 .25
110	Prussian, S. L	Colo	1,500,000	150,000	10			132,000	Apl 1883 .10
111	Quicksilver, pref., Q	Cal..	4,300,000	43,000	100			849,650	Jan. 1887 1.50
112	" com., Q	Cal..	5,700,000	57,000	100			151,000	July 1882 .40
113	Quincy, C	Mich	1,000,000	40,000	25	200,000	Dec. 1862	4,570,000	Jan 1887 4.00
114	Richmond, S. L	Nev..	1,350,000	54,000	25	*		4,245,087	Dec. 1886 1.25
115	Ridge, C	Mich.	500,000	20,000	25	220,000	Mar 1886 .50	10,000	Feb. 1880 .50
116	Rising Sun, S	Dak..	750,000	150,000	5	*		52,000	May 1881 .07½
117	Robinson Con., S. L.	Colo.	10,000,000	200,000	50	*		585,000	Mar. 1886 .05
118	Robert E. Lee, S. L	Colo	10,000,000	500,000	20			100,000	Dec. 1882 .10
119	Rooks, G	Vt..	500,000	50,000	10	*		61,000	Apr. 1885 .30
120	San Francisco, C	Cal..	5,000,000	50,000	100	45,000	Sept 1880 .50	20,000	Feb. 1883 .05
121	Savage, S	Nev..	11,200,000	112,000	100	6,156,000	Jun. 1886 .50	4,460,000	July 1869 3.00
122	Security L. Mg., Mfg.	Colo.	1,000,000	100,000	10	*		50,000	July 1884
123	Shoshone, G	Idah.	150,000	150,000	1			7,500	Apl. 1883 .01
124	Sierra Buttes, G	Cal..	225,000	22,500	10			1,438,964	Oct. 1886 .37
125	Sierra Grande, S	N. M.	2,500,000	500,000	5			860,000	Sept 1884 .25
126	Sierra Nevada, G. S.	Nev..	10,000,000	100,000	100	6,212,000	Mar. 1887 .50	102,000	Jan. 1871 1.00
127	Silver Cord, G. S. L.	Colo.	5,000,000	500,000	10			225,000	Nov. 1883 .25
128	Silver King, S	Ariz.	10,000,000	100,000	100			1,850,000	Feb 1887 .25
129	Silverton, G. S. L	Colo.	2,000,000	200,000	10	*		74,000	Nov 1886 .02
130	Small Hopes Cons., S.	Colo.	5,000,000	250,000	20	*		2,662,500	Mar. 1887 .20
131	Smuggler, S. L	Colo.	600,000	60,000	10	*		66,700	Aug. 1883 .25
132	Socorro, C	N. M.	250,000	4,000	100			4,000	Mch 1882 .00¼
133	South Yuba, G	Cal..	2,000,000	40,000	50	*		150,000	Oct. 1881 .75
134	Spring Valley, G	Cal..	250,000	2 500	1	50,000	Oct. 1886 .25	50,000	Jan. 1881 .25
135	Standard, G. S	Cal..	10 000,000	1 000	100	25,000	Oct. 1884 .25	4,425,000	Mar. 1884 .25
136	Stormont, S	Utah	500,000	500,000	1	*		155,000	Nov. 1881 .05
137	St. Joseph, L	Mo..	1,500,000	150,000	10	*		754,000	Mar. 1887 .20
138	Syndicate, G	Cal..	10,000,000	100,000	100	38,729	July 1882 .15	48,308	Sept 1885 .10
139	Tip Top, S	Ariz.	10,000,000	100,000	100	253,000	Sept 1883 .25	100,000	Nov. 1881 .20
140	Tombstone, G. S. L.	Ariz	12,500,000	500,000	25	*		1,250,000	Apl. 1882 .10
141	True Fissure, G. S. L.	Utah	1,500,000	150,000	10	*		75,000	Jun. 1883 .15
142	United Verde, C	Ariz.	3,000,000	300,000	10	*		97,500	Feb. 1884 .20
143	Valencia, M	N. H.	150,000	1,500	100	*		37,500	Apl 1886 2.50
144	Viola Lt., S. L	Idah.	750,000	150,000	5	*		55,750	Feb. 1887 .12½
145	Vizina, S	Ariz..	5,000,000	200,000	25	*		140,000	Apl. 1882 .10
146	Yankee Girl	Colo.	2,500,000	250,000	10	*		1,075,000	Jan 1887 .05
147	Yellow Jacket, G. S.	Nev.	12,000,000	120,000	100	5,448,000	Dec. 1885 .75	2,184,000	Aug. 1871 1.50

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par Value.	Assessments. Total levied to date.	Assessments. Date and amount per share of last.
1	Agassiz Cons., S. L	Colo.	$2,500,000	50,000	$50	*	
2	Albion, S. L	Nev.,	15,000,000	150,000	100	$577,000	July 1883 .50
3	Allouez, C	Mich	2,000,000	80,000	25	240,000	Feb. 1884 .50
4	Alpha Con., G. S	Nev.,	3,000,000	30,000	100	445,000	Jan. 1887 .50
5	Alta, S	Nev.,	10,080,000	100,800	100	2,027,000	Feb. 1887 .50
6	Amador, G	Cal..	400,000	200,000	2	*	
7	American Flag, S	Colo.	1,250,000	125,000	10	300,000	Jun. 1877 .25
8	Anglo-Montana, Lt.	Mon.	600,000	120,000	5		
9	Appalachian, Lt., G.	N. C.	1,500,000	300,000	5		
10	Aspen Mg. & S., S. L	Colo.	2,000,000	200,000	10		
11	Barcelona, G	Nev.,	5,000,000	200,000	25	*	
12	Battle Creek, G	Dak.	5,000,000	200,000	25		
13	Bear Creek	Cal..	300,000	300,000	1		
14	Bechtel Con., G	Cal..	10,000,000	100,000	100	173,500	Jan. 1883 .10
15	Belmont, S	Nev.,	5,000,000	50,000	100	735,000	Apl. 1886 .10
16	Best & Belcher, G. S.	Nev.,	10,080,000	100,800	100	1,708,990	Mar. 1887 .50
17	Big Pittsburg, S. L	Colo.	20,000,000	200,000	100	*	
18	Bi-Metallic, S	Mon.	5,000,000	200,000	25	*	
19	Black Jack, G	Cal..	250,000	100,000	2½		
20	Bonanza Chief	Mon	1,000,000	1,000,000	1	*	
21	Bondholder	Colo.	500,000	200,000	2½		
22	Boston Con., G	Cal..	10,000,000	100,000	100	170,000	Nov 1883 .25
23	Bradshaw, S	Ariz.	2,250,000	225,000	10	*	
24	Brunswick, G	Cal..	2,000,000	400,000	5	*	
25	Bullion, G. S	Nev.,	10,000,000	100,000	100	5,000,000	Jan. 1887 .40
26	Bye and Bye	Ariz.	1,000,000	100,000	10	*	
27	Calaveras, G	Cal..	500,000	500,000	1	*	
28	Carisa, G	Wy	500,000	100,000	5	*	
29	Catskill, S	Nev.,	1,500,000	30,000	5		
30	Con Contin'l, G. S. L.	C. & A	2,000,000	200,000	10	*	
31	Charles Dickens	Idah.	1,250,000	250,000	5		
32	Cherokee, G	Cal..	1,500,000	150,000	10		
33	Chollar, S	Nev.,	11,200,000	112,000	100	1,096,000	Nov 1886 .50
34	Cinnamon Mt., G. S	Colo.	750,000	150,000	5		
35	Climax, S. L	Colo.	2,000,000	200,000	10	*	
36	Colorado No. 2, S. L	Colo.	100,000	10,000	10		
37	Con. Imperial, G. S.	Nev.,	50,000,000	500,000	100	1,100,000	Aug. 1886 10
38	Con. Pacific, G	Cal..	6,000,000	60,000	100	174,000	Feb. 1886 .15
39	Cons Silver, S	Mo..	2,500,000	250,000	10		
40	Cop. Queen Cons, C.	Ariz	1,400,000	140,000	10		
41	Courtlandt	Colo	500,000	50,000	10		
42	Crescent, S. L	Colo.	3,000,000	300,000	10	*	
43	Crocker, S	Ariz.	10,000,000	100,000	100	65,000	May 1886 .20
44	Crowell, G	N. C	500,000	500,000	1		
45	Dahlonega, G	Ga...	250,000	250,000	1	*	
46	Dandy, S	Colo.	5,000,000	500,000	10		
47	Dardanelles, G	Cal..	1,000,000	100,000	10		
48	Decatur, S	Colo.	1,500,000	300,000	5	*	
49	Denver City, S. L	Colo.	5,000,000	500,000	10	*	
50	Denver Gold	Colo.	300,000	60,000	5		
51	Deseret, G	Utah	500,000	50,000	10	*	
52	Dunderberg, S	Colo.	1,500,000	150,000	10	*	
53	Durango, G	Colo.	500,000	500,000	1	*	
54	Durango T	Mex	120,000	1,200	100		
55	Eastern Dev. Co., Lt.	N. S	1,500,000	150,000	10	990,000	Mar. 1886 1.00
56	El Cristo, G. S	U.S.C	1,000,000	500,000	2		
57	Empire Lt., G	Mon.	500,000	100,000	5		
58	Empire, S	Utah	10,000,000	100,000	100	*	
59	Enterprise, S. L	Colo.	800,000	80,000	10	*	
60	Eureka Tunnel, S. L	Nev.,	10,000,000	100,000	100	*	
61	Exchequer	Nev.	10,000,000	100,000	100	860,000	Oct. 1886 .20
62	Gold Cup, S	Colo.	500,000	500,000	1	*	
63	Gold Placer, G	Colo.	5,000,000	200,000	25	229,314	Dec. 1885 .25
64	Goodshaw, G	Cal..	10,000,000	100,000	100	*	
65	Grand Belt, C	Colo.	12,000,000	120,000	100		
66	Grand Duke	Colo.	800,000	80,000	10	*	
67	Gregory-Bobtail, G	Colo.	550,000	550,000	1		
68	Gregory Con., G	Mon.	3,000,000	300,000	10		
69	Harlem M. & M. Co, G.	Cal..	1,000,000	200,000	5		
70	Head Cent. & Tr. S. G	Ariz.	10,000,000	100,000	100		
71	Hidalgo, S	Mex.	200,000	20,000	10		
72	Highland, C	Mich	500,000	25,000	25		
73	Hortense, S	Colo.	2,000,000	200,000	10		
74	Iron Gold & Silver, S	N. M.	2,000,000	200,000	10		
75	Iroquois, C	Mich	1,250,000	50,000	25		
76	J. D. Reymert	Ariz	10,000,000	100,000	100	*	
77	Julia Cons., G. S	Nev.,	11,000,000	110,000	100	1,438,000	Nov 1885 .10
78	Kearsarge, C	Mich	1 250,000	50,000	25	100,000	Apl. 1886 5.00
79	Laclede	N. M.	2,000,000	200,000	10		
80	Lacrosse, G	Colo.	1 000 000	100,000	10	*	
81	Lee Basin, S	Colo.	5,000,000	500,000	10	*	
82	Leviathan, S	Nev.,	10,000,000	100,000	100	380,000	Sept 1882 .25
83	Lucerne, S	Colo.	5,000,000	500,000	10	*	Jan. 1885 .10
84	Mammoth Bar., G	Cal..	10,000,000	100,000	100	50,000	Dec. 1881
85	Mariposa pref., G	Cal..	5,000,000	50,000	100	1,687,500	Feb. 1883 .25
86	" common, G	Cal..	10,000,000	100,000	100	1,975,000	Dec. 1881 .20
87	May Belle, G	Cal..	10,000,000	100,000	100	84,000	Mar. 1884 .15
88	Mayflower Gravel	Cal..	1,000,000	100,000	100	135,000	Jan. 1887 .25
89	Mexican, S	Nev.,	10,000,000	100,800	100	2,590,960	Jan. 1887 .25
90	Middle Bar G	Cal..	400,000	200,000	2	*	
91	Mine & Smelt., S. L	Colo.	1,000,000	200,000	5	*	
92	Miner Boy, G. S. L	Colo.	5,000,000	500,000	10	*	
93	Miller	Nev	5,000,000	200,000	25		
94	Moose Silver, S	Colo.	3,000,000	300,000	10	*	
95	Nachoochee, Lt., G.	Ga..	1,000,000	200,000	5		
96	New Germany, G	N. S.	100,000	100,000	1	*	
97	New Pittsburg, S. L	Colo.	2,000,000	200,000	10	*	
98	North Standard, G.	Cal..	10,000,000	100,000	100	20,000	Nov
99	Noonday	Cal..	600,000	60,000	10	208,000	Dec. 1881 .10
100	Old Dominion, C	Ariz.	3,000,000	300,000	10		
101	Oriental	Nev..	2,000,000	200,000	10		
102	Oriental & Miller, S.	Nev..	10,000,000	400,000	25		
103	Overman, G. S	Nev..	11,520,000	115,200	100	3,736,880	Jan. 1887 .30
104	Parrott, G	Mon.	1,800,000	180,000	10		
105	Park, S	Utah	2,000,000	200,000	10		
106	Peer, S	Ariz.	10,000,000	100,000	100	135,000	Nov. 1886 .10
107	Peerless, S	Ariz.	10,000,000	100,000	100	295,000	Nov. 1886 .20
108	Phœnix	Ariz.	500,000	500,000	1	*	
109	Phœnix Lead	Colo.	100,000	100,000	1	*	
110	Potosi	Nev..	11,200,000	112,000	100	1,145,600	Mar. 1887 .30
111	Puritan, S. G	Colo.	1,500,000	150,000	10	*	
112	Quincy	Colo.	3,000,000	300,000	10		
113	Rappahannock, G. S.	Va..	250,000	250,000	1	*	
114	Red Elephant, S	Colo.	500,000	500,000	1	*	
115	Rollins, G. S	Colo.	5,000,000	200,000	25	*	
116	Ropes, G. S	Mich	2,000,000	80,000	25	63,200	Mar 1886 .10
117	Security, S	Colo.	10,000,000	1,000,000	10		
118	Sheridan	N. M.	2,000,000	200,000	10		
119	Silver Queen, C	Ariz.	5,000,000	200,000	25	*	
120	Sonora Con	Mex.	5,000,000	200,000	25	*	
121	South Bulwer, G	Cal..	10,000,000	100,000	100	100,000	May 1881 .25
122	South Hite	Cal..	10,000,000	100,000	100	195,000	Jan. 1883 .05
123	South Pacific	Cal..	500,000	100,000	5		
124	Stanislaus, G	Cal..	2,000,000	200,000	10		
125	State Line, S	Nev..	250,000	250,000	1	*	
126	St. Louis & Mex., S.	Mex.	5,000,000	500,000	10	*	
127	St. Louis & St Elmo	Colo.	2,000,000	200,000	10		
128	St. L. & St. Felipe, G. S.	Mex.	1,500,000	150,000	10		
129	St. L. & Sonora, G. S.	Mex.	1,500,000	150,000	10		
130	St. Louis & Yavapai	Ariz.	3,000,000	300,000	10		
131	Sunday Lake,	Mich	1,250,000	50,000	25		
132	Sullivan, G. S. L	Me...	500,000	100,000	5	125,000	Dec. 1882 .25
133	Sutro Tunnel	Nev..	20,000,000	2,000,000	10	*	
134	Tamarack, C	Mich.	1,000,000	40,000	25	520,000	Apl. 1885 3.00
135	Taylor-Plumas, G	Cal..	1,000,000	200,000	5	*	
136	Tioga Cons., G	Cal..	10,000,000	100,000	10	*	
137	Todos Santos, S	Mex.	1,000,000	100,000	100	325,000	Oct. 1882 .10
138	Tuscarora, S	Nev.	10,000,000	100,000	100	110,000	Oct. 1881 .15
139	Unadilla, S	Colo.	50,000,000	500,000	100	*	
140	Union Con., G S	Nev.	10,000,000	100,000	100

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	March 19.		March 21.		March 22.		March 23.		March 24.		March 25.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon	.....	.....	....	.....	....	....	....	.....	1.60	.....	....	....	700
Argenta, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.15	.....	300
Bassick, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belle Isle, Nev	.50	.45	.....	.....	.63	.58	.72	.62	.82	.75	1.10	.78	20,400
Bodie Cons., Cal	1.00	.....	....	.....	2.60	.....	.....	.....	.....	.....	.....	.....	300
Breece, Colo	.52	.50	.....	.....	.....	.....	.....	.....	.56	.....	.60	.58	1,300
Bulwer, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Caledonia, Dak	1.30	.....	1.30	.....	.....	.....	.....	.....	1.30	1.25	.....	.....	1,080
Chollar, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chrysolite, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colorado Cent'l, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cons. Cal. & Va., Nev	.....	.....	17.00	.....	17.25	.....	16.13	16.00	16.00	.....	.....	.....	800
Crown Point, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Deadwood, Dak	.....	.....	.....	.....	2.05	2.00	2.00	.....	.....	.....	.....	.....	500
Dunkin, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eureka Cons., Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Father de Smet, Dak	.75	.....	.76	.75	.....	.....	.80	.....	.....	.....	.....	.....	900
Freeland, Colo	.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
Gold Stripe, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	700
Gould & Curry, Nev	.....	.....	.....	.....	5.50	.....	.....	.....	.05	.....	.....	.....	100
Green Mountain, Cal	.....	.....	.....	.....	.....	.....	.40	.....	.40	.....	.45	.38	1,100
Hale & Norcross, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Homestake, Dak	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Horn-Silver, Ut	.....	.....	1.10	.....	.....	.....	.....	.....	.....	.....	1.25	.....	300
Independence, Nev	.....	.....	.....	.....	.....	.....	.....	.....	60	.....	.....	.....	100
Iron Hill, Dak	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iron Silver, Colo	.....	.....	2.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
Leadville C., Colo	.70	.....	.....	.....	.....	.....	.70	.68	.....	.....	.....	.....	1,200
Little Chief, Colo	.....	.....	.....	.....	.....	.....	.30	.29	.29	.....	.28	.27	1,700
Little Pittsburg, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.41	.....	.42	.40	300
Martin White	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Moulton, Mont	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Navajo, Nev	.78	.....	.80	.....	.95	.90	.95	.90	.93	.....	1.10	1.00	5,900
North Belle Isle, Nev	4.90	4.80	.....	.....	6.75	6.25	7.75	7.25	8.00	7.50	8.75	8.00	1,800
Ontario, Ut	.....	.....	25.00	.....	.....	.....	.....	.....	25.00	.....	25.50	.....	450
Ophir, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plymouth, Cal	17.25	.....	17.25	.....	17.50	17.25	.....	.....	17.63	.....	.....	.....	945
Quicksilver Pref., Cal	.....	.....	.....	.....	31.25	.....	31.00	.....	.....	.....	.....	.....	200
" Com., Cal	.....	.....	.....	.....	.....	.....	.....	.....	6.50	.....	6.25	.....	200
Robinson Cons., Colo	.....	.....	.44	.....	.....	.....	.....	.....	.44	.43	.....	.....	500
Savage, Nev	.....	.....	6.00	.....	.....	.....	6.25	.....	.....	.....	5.25	.....	250
Sierra Nevada, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver King, Ariz	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard, Cal	.....	.....	.....	.....	.....	.....	1.00	.....	.....	.....	.....	.....	100
Stormont, Ut	.....	.....	.....	.....	.12	.....	.11	.....	.....	.....	.....	.....	1,400
Yellow Jacket, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	March 19.		March 21.		March 22.		March 23.		March 24.		March 25.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Amador, Cal	1.75	1.70	1.80	1.75	1.85	1.80	1.90	1.85	2.05	1.90	2.20	2.10	17,700
Am. Flag, Colo	.....	.....	.....	.....	.10	.....	.....	.....	.....	.....	.10	.....	400
Barcelona, Nev	.....	.....	.35	.33	33	.....	.34	.....	.36	.35	.....	.....	6,000
Bechtel Con., Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belcher, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Best & Belcher, Nev	.....	.....	10 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Big Pittsb'g, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bullion, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bull-Dom'go, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Castle Creek, Id	.16	.15	.15	.....	.15	.....	.16	.15	.18	.17	.18	.17	9,100
Central Ariz., Ariz	.....	.....	.....	.....	.....	.....	.13	.....	.15	.....	.....	.....	200
Columbia & Beaver	.05	.....	.....	.....	.05	.....	.....	.....	.04	.....	.....	.....	2,500
Cons. Imperial, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Con. Pacific, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dahlonega	.....	.....	.....	.....	.....	.....	.02	.....	.....	.....	.....	.....	3,000
Decatur	.....	.....	.....	.....	.....	.....	.....	.....	.01	.....	.02	.....	2,000
Eastern Oregon	.....	.....	.....	.....	.02	.....	.02	.....	.02	.....	.....	.....	7,000
El Cristo, U. S. Col	7.00	6.37	7.63	7.00	8.25	7.50	8.87	8.25	9.50	9.00	9.63	4.95	120,635
Goodshaw, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Helena	.....	.....	.....	.....	.....	.....	.....	.....	1.45	.....	.....	.....	100
Holyoke	.18	.16	.19	.18	.20	.19	.21	.19	.23	.21	.25	.22	118,200
Julia, Nev	.95	.....	1.10	1.00	.....	.....	.....	.....	.....	.....	.85	.....	700
Justice, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kossuth, Nev	.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	500
Lacrosse, Colo	.....	.....	.16	.....	.....	.....	.15	.....	.15	.....	.16	.....	3,800
Mexican, Nev	1.70	1.50	.....	.....	.....	.....	5.87	.....	.....	.....	.....	.....	500
Middle Bar, Cal	.91	.....	.94	.91	.96	.93	1.05	.97	1.25	1.05	1.25	1.15	92,500
Mono, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Germany, N.S.	.54	.....	.53	.50	.51	.....	.....	.....	.53	.52	.53	.....	8,300
New Pittsb'g, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Stana'd, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Horn-Silv'r, Ut	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ori'nt'l&Mil'r, Nev	.....	.....	.25	.....	.....	.....	.25	.24	.....	.....	.24	.....	2,700
*Phœnix, Ariz	3.87	3.62	4.00	3.75	4.12	3.87	4.25	3.62	4.37	4.00	4.50	4.00	28,360
Potosi, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rappahannock, Va	.....	.....	.....	.....	.16	.....	.....	.....	.16	.....	.15	.....	2,600
Red Eleph't, Colo	.....	.....	.....	.....	.....	.....	.04	.03	.04	.....	.....	.....	1,400
Saint Kevin	.....	.....	.....	.....	.....	.....	.....	.....	.70	.50	.70	.60	10,100
Security, Colo	7.00	6.75	6.87	6.00	6.25	5.87	6.25	5.25	6.00	5.12	6.00	5.87	14,350
Silver Cliff, Colo	.16	.14	.....	.....	.14	.....	.15	.14	.16	.14	.16	.....	11,000
Silver Queen	.20	.....	.20	.....	.....	.....	.....	.....	.....	.....	.22	.17	5,100
Sonora Con., Mex	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stanislaus, Cal	3.45	3.35	3.45	3.25	3.40	3.25	3.40	3.20	3.20	3.00	3.05	2.95	8,200
State L'e, 1&4, Nev	.07	.06	.05	.....	.....	.....	.05	.....	.06	.05	.....	.....	3,800
" Nos. 2 & 3, Nev	.....	.....	.....	.....	.05	.....	.08	.06	.08	.07	.....	.....	10,100
Sutro Tunnel, Nev	.21	.....	.22	.21	.....	.....	.21	.19	.22	.21	.20	.19	15,200
Taylor Plumas, Cal	.08	.....	.08	.....	.08	.....	.08	.....	.08	.06	.10	.07	66,900
Tioga, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Unadilla, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union Cons., Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Utah, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Dealt in at the New York Stock Exchange Unlisted Securities.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Mar. 18.		Mar. 19.		Mar. 21.		Mar. 22.		Mar 23.		Mar. 24.		SALES.
Amie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Allouez	1.87	.....	1.75	.....	1.87	.....	.....	.....	1 87	.....	.....	.....	500
Atlantic	.....	.....	9.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	67
Bodie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bonanza D	1.50	1.37	1.37	1.35	1.50	.....	1.50	1.37	1 50	1.37	1.37	.....	4,700
Boston & Montana	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.00	.....	200
Breece	.55	.....	.57½	.55	57½	.....	.60	.57½	62½	.60	.60	.....	2,500
Calumet & Hecla	212	.....	215	212	215	214	.....	.....	214	.....	214	.....	65
Catalpa	.37½	.....	38	.37½	.....	.....	.....	.....	.37½	.....	.....	.....	900
Central	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chrysolite	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Con. Virginia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dunkin	.36	.....	.36	.....	.....	.....	.36	.....	.36	.....	.....	.....	900
Eureka	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin	11.75	11.50	11.37	11.00	11.50	11.00	.....	.....	.....	.....	11 25	.....	635
Freeland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Helena	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Honorine	.....	.....	.....	.....	.....	.....	.....	.....	.80	.....	.....	.....	200
Kearsage	7.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	150
Osceola	20.50	.....	22.00	21.00	22.00	.....	.....	.....	21.00	.....	22.00	.....	563
Pewabic	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quincy	50.50	.....	51.00	50.50	51.00	50.50	51.00	.....	50.50	50.00	50.00	.....	378
Robinson	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Security	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver King	8.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10
Standard	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stormont	.12	.....	.12	.....	.12	.....	.12	.....	.12	.....	.....	.....	1,900

NAME OF COMPANY.	Mar. 18.	Mar. 19.	Mar. 21.	Mar. 22.	Mar. 23.	Mar. 24.	SALES.
Alma	.....	.....	.....	.....	.....	.....	.....
Arnold	.....	.....	.....	.....	.....	.....	.....
Bijou	.....	.....	.....	.....	.....	.....	.....
Blue Ridge	.20	.....	.....	.20	.....	.....	500
Bowman Silver	.11	.....	.....	.....	.....	.....	1,000
Cliff	.....	.....	.....	.....	.....	.....	.....
Con. Pacific	.....	.....	.....	.....	.....	.....	.....
Crescent	.....	.....	.....	.13	.....	.....	200
Cual	.....	.....	.....	.20	.....	.....	200
El Cristo	.....	.....	.....	.....	.....	.....	.....
Empire	.....	.....	.05	.....	.....	.....	300
Fern	.....	.....	.....	.....	.....	.....	.....
Humboldt	.....	.....	.....	.....	.....	.....	.....
Huron	.....	1 75	1.75	.....	1.75	1.75	425
Mesnard	.....	.....	.....	.....	.....	.....	.....
Mona	.....	.....	.....	.....	.....	.....	.....
Napa	.....	.....	.....	.....	.....	1.00	.....
National	.50	.....	.....	.....	.....	.....	250
Native	.....	.....	.....	.....	.....	.....	100
Oriental & Miller	.....	.....	.28	.....	.28	.....	.....
Plato	.....	.....	.....	.....	.....	.....	500
Ridge	.....	.....	.....	.....	.....	.....	.....
Rappahannock	.18	.....	.....	.....	.17	.....	700
St. Mary's	.....	.....	.....	.....	.....	.....	.....
Sutro Tunnel	.....	.....	.....	.....	.....	.....	.....
Tamarack	.....	.....	.....	.....	.....	.....	.....
Washington	.....	.....	.....	.....	.....	.....	.....

New York: Dividend shares sold, 43,925. Non-dividend shares sold, 573,145. Total New York, 617,070.
Boston: Dividend shares sold, 13,668. Non-dividend shares sold, 4,175. Total Boston, 17,843.

COAL STOCKS.

NAME OF COMPANY.	Par value of shares.	March 19.		March 21.		March 22.		March 23.		March 24.		March 25.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Barclay Coal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cameron Coal	50	45½	.....	45½	.....	45½	44½	45½	.....	.....	.....	45½	.....	650
Col., C. & I	100	39⅝	39	39⅝	39	39	38¾	39	38¾	40	38⅞	40⅛	39⅝	11,784
Ches. & O. RR	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
*Chic. & Ind. Coal RR	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Col. & Hocking Coal	.....	39	.....	39¼	39	39⅛	.....	40¾	40	42	40½	42⅛	41⅛	5,740
Consol. Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cumb. C. & I	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Del. & H. C	100	101½	101	101½	101⅜	101⅝	.....	101	100⅝	101½	101	101½	101⅜	3,250
D., L. & W. RR	50	134¼	133½	134½	133⅞	135	134	135⅛	134¼	136⅛	134⅞	136⅝	135⅝	87,015
Elk Lick Coal Co	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hocking Valley	100	30½	29⅛	31	30¼	31¼	30½	31¼	30¾	31¾	31½	32	31	6,770
Lehigh C. & N.†	50	50¼	50	50	.....	50	.....	50	.....	50	.....	.....	.....	335
Lehigh Valley RR.†	50	56½	.....	56⅛	.....	55⅜	.....	55⅝	55½	56	55⅝	.....	.....	277
L. & W. C. & I. Co	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montauk Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morris & Essex	50	.....	.....	.....	.....	137	.....	138	.....	.....	.....	138	.....	1,000
New Central Coal	100	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	14	.....	200
N. J. C. RR	100	70¼	69¾	70⅜	69⅝	70⅜	69¾	69⅞	.....	71⅛	70¼	71⅛	70¾	8,964
N. Y. & S. Coal	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Y., Susq. & Western	100	12⅞	12¾	12¾	12⅝	12⅛	.....	12¾	.....	13	12⅞	13⅜	13⅛	2,457
Do. pref	100	35½	35¼	35¾	.....	36	35¾	35¾	.....	36⅛	36	36⅜	36⅛	2,285
N. Y. & Perry C. & I	100	.....	.....	.....	.....	.....	.....	.....	.....	71⅞	71¾	.....	.....	300
Norfolk & Western R R	100	.....	.....	20⅝	20½	20	19¾	20	.....	.....	.....	20¼	20	1,125
Do. pref	100	49¼	49	49⅜	49	49	48¾	48⅞	48⅜	48½	48⅜	48⅞	48½	3,535
Penn. Coal	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Penn. RR.†	50	58⅛	58	58¼	57⅞	58⅛	57⅞	58¼	58⅛	58¼	58⅛	.....	.....	5,418
Ph. & R. RR.**	50	38⅜	37⅞	38⅝	37⅜	38¼	37⅞	38⅛	37⅞	38⅞	38⅛	38⅞	38½	124,234
Spring Mountain	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee C. & I. Co	100	.....	.....	45	44¾	47¼	45½	45½	45	.....	.....	46¾	46½	2,315
Westmoreland Coal†	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

** Of the sales of this stock, 23,262 were in Philadelphia, and 100,972 in New York.
† The quotations for these stocks are not percentage, but actual price.
* Dealt in at the New York Stock Exchange, Unlisted Securities.

Total sales, 267,654.

San Francisco Mining Stock Quotations.

COMPANY.	CLOSING QUOTATIONS. Mar. 18.	Mar. 19.	Mar. 21.	Mar. 22.	Mar. 23.	Mar. 24.
Albion	.....	.....	.....	.....	.....	.....
Alpha	.....	.....	.....	.....	.....	.....
Alta	2⅛	2⅛	2¼	2¼	2⅛	2⅛
Argenta	.....	.....	.....	.....	.....	.....
Bechtel	.....	.....	.....	.....	.....	.....
Belcher	.....	.....	.....	.....	.....	.....
Belle Isle	.....	.....	.....	.....	.....	.....
Best & Belcher	9⅝	9⅛	9⅝	9⅝	8¾	7¾
Bodie	2⅛	2	2¾	2¾	2¾	2⅛
Bulwer	1¼	1¼	.....	1¼	1¼	1⅛
Chollar	6¾	.....	7	6⅞	6½	5¾
Con. Cal. & Va	16¾	16¼	16¾	16¼	15¾	15
Con. Pacific	.....	.30	.....	.35	.35	.30
Crown Point	4⅛	3⅞	4	4¼	4⅛	3¾
Eureka Cons	.....	.....	.....	.....	.....	.....
Gould & Curry	4¾	4⅛	5¼	5⅛	4¾	4⅛
Grand Prize	.....	.....	.....	.....	.....	.....
Hale & Norcross	5	4⅞	5¼	5	4⅞	4⅜
Martin White	.....	.....	.....	.....	.....	.....
Mexican	5⅞	5⅜	6	6¼	5⅜	5
Mono	2⅜	2¼	2⅛	.....	2⅛	2¼
Mount Diablo	4¼	.....	4¼	4¼	4¼	.....
Navajo	.80	.80	.80	.90	.90	1
Ophir	10⅛	9⅜	10⅛	10	9⅜	8⅜
Potosi	8¼	8	8⅛	7⅞	7⅛	7⅛
Savage	5⅜	5⅜	6⅜	6⅜	5¾	5½
Scorpion	.....	.....	.....	.....	.....	.....
Sierra Nevada	4⅛	4¼	4¾	4½	4¼	3⅞
Sutro Tunnel	.....	.....	.....	.....	.....	.....
Tip Top	.....	.....	.....	.....	.....	.....
Union Cons	3½	3⅝	4	3¾	3⅝	3⅜
Utah	1⅜	1⅜	1⅛	1⅛	1⅜	1⅛
Yellow Jacket	5	4¾	5¼	5½	4¾	4½

ion exists, and will continue to exist with dealers. In regard to a weaker feeling about raw iron, Pittsburg is not alone; reports from the leading markets both East and West report dullness prevailing. Even the foreign markets have caught the prevailing fever. The quiet condition ruling at this time is due largely to a single fact, that furnaces, mills, and shops are oversold.

A further rush of orders was checked by the strong prices named by home and foreign makers. At present date there are few offerings, and a limited inquiry. Both sides have left market, apparently, and meantime unprecedented activity prevails at the mills. Production has been speeded up to the highest point here and elsewhere. Relining and repairing of furnaces is going on, mill capacity is being improved, and more new mill and furnace work is projected than ever before.

Prices of iron show only a slight change, although it is not unlikely that lots here and there could be picked up at slight concessions from the asking rates. This includes almost everything on the list, and yet there is nothing like general or positive weakness in anything. The market is therefore a waiting one, and no one appears willing to make any positive move, all waiting for further developments.

	$	$
Coke or bituminous:		
Foundry No 1	21.25@21 75	
Foundry No. 2	20.75@21.25	
Gray F., No. 3	20.25@20.50	
" " No. 4	19.25@19.50	
White	18.25@18.50	
Mottled	18.75@19.25	
Silvery	19.00@20.00	
Bessemer	22.50@23.00	
Charcoal:		
Foundry No. 1	24.00@25.00	
Foundry No. 2	23.00@24.00	
Cold-Blast	27.00@30.00	
Warm-Blast	24.00@25.00	
20 p. c. Spiegel	@31.00	
Muck-Bar		34.00@35 00
Steel Blooms		34.50@36.00
Steel Slabs		33.00@35.00
Steel Crop Ends		24.50@25.00
St'l Bl'm Ends		24.00@24.50
Old Iron Rails		26.00@27 00
Old Steel Rails		24.00@25.00
No. 1 W. Scrap		25.00@26.00
No. 2 W. Scrap		23.00@24.00
Steel Rails		41.00@41.50
" light sect's		40.00@45.00
Bar Iron		2.00@.. ..
Nails $2.60 net car lots.		
Steel Nails $2.60 net car lots.		

SALES SINCE LAST REPORT.

50 Tons	No. 2 Foundry, all Lake Ore	$21.40 cash.
100 Tons	No. 1 Foundry, all Lake Ore	21.70 cash.
100 Tons	off Bessemer, Lake Ore	22.50 4 mo.
1000 Tons	Spot Bessemer, Lake Ore	23 00 cash.
2000 Tons	April Bessemer, Lake Ore	23.25 cash.
1500 Tons	Bessemer, High Phos. Lake Ore	22.75 cash.
500 Tons	Gray Forge, Lake Ore	20.25 cash.
200 Tons	Steel Billets	36.00 cash.
500 Tons	" "	36.25 cash.
1000 Tons	Muck Bars, April and May	36.00 cash.
800 Tons	" Spot.	35.25 cash.
500 Tons	" April.	35.50 cash.
1000 Tons	Steel Wire Rods, 5s	46.00 cash.
500 Tons	" " 5s	46 25 cash.
6 Tons	Charcoal, No. 1 Foundry	25.50 cash.
62 Tons	" No. 2 "	24.50 cash.
30 Tons	Cold Blast, Charcoal	29.50 cash.
1000 Tons	Muck Bar	34 00 cash.
1500 Tons	Iron Rails, D. H. in Valley	26.00 cash.

FINANCIAL.

Mining Stocks.

NEW YORK, Friday Evening, March 25.

Great activity has been displayed in this market during the past week, and prices continue to move upward. The total transactions amounted to 617,070 shares. In prominent stock houses, we notice considerable dealings in mining stocks.

Security continues to play its game. Elsewhere we publish some comments made on this company by Colorado papers. They are of a *highly complimentary character*, and the company must feel *flattered* that it is so much thought of at home! The stock has declined from $7@$5.12, and to-day sold at from $6@$5.87. The dealings of the other Colorado stocks were small, and without any special feature. Silver Cliff sold largely at 14@16c. Breece, at from 50@60c. Leadville, 70@60c. Little Chief, at from 30@27c. Lacrosse, at from 15@16c. Robinson, at from 43@44c. Little Pittsburg, at from 40@42c. Iron Silver, at $2.80. Freeland, at 75c.

Phœnix continues to attract attention, though the sales have been small as compared with previous weeks, and the stock firm at from $3.62@$4.50. The manipulators are no doubt preparing for another deal, and as soon as the time is ripe the "sheep" will be sheared!

Prof. P. de P. Ricketts, as we announce elsewhere, will leave for Arizona, probably to-morrow, to examine the company's mine.

St. Kevin made its appearance among the unlisted securities on the Stock Exchange yesterday afternoon, opening at 50 cents, and in a less number of minutes advanced 20 cents per share. The prices to-day ranged at from 60@70c.

It has been announced that San Diego would be called to-morrow afternoon. It was stated that it would open at $3, but it has sold at $4@$4.50.

Father de Smet is waking up, and shows larger sales at from 75@80c. Deadwood shows a small business at from $2@$2.05. Caledonia was active at from $1.25@$1.30.

It is stated the Rappahannock company's report for this month will show very satisfactory results. The stock is firm at 15@16c.

Castle Creek and Holyoke both show a small advance, the former from 15@18c. and the latter from 16@25c.

Hecla, which has been dormant for many weeks, appeared on the list again yesterday at $1.45. Alice shows a sale of a few hundred shares at $1.60.

New Germany was quiet, at from 50 to 54c.

Dispatches from San Francisco announce that Judge Sabin, of the United States District Court of Nevada, has denied the motion to permit the stockholders of the Sutro Tunnel to intervene in the suit brought by McCalmont Brothers, of London, to forclose their mortgage on the property. The petitioners were represented by S. M. Wilson, and the complainants who opposed the petition were represented by Louis T. Haggin. The stock was quiet, ranging from 19@22c. Consolidated California & Virginia has suffered a further decline from $17.25 to $16. The other Comstocks have been firm. Best & Belcher at $10. Gould & Curry at $5.50. Savage declined from $6.25 to $5.25. Mexican advanced from $5.50 to $5.87.

The Tuscorora stocks have had a boom of their own. The feature was the advance of North Belle Isle from $4.80 to $8.75. Belle Isle was also higher, going from 45c. to $1; and Navajo from 78c. to $1.10. Independence sold at 60c.

The speculative interest in Middle Bar has not abated, and the stock has continued to advance from 91c. to $1.25, sales of 92,500 shares. Amador w's in sympathy with Middle Bar, and also showed higher prices at from $1.70@$2.20. Stanislaus shows a downward movement, and went from $3.45 to $2.95 Taylor Plumas shows a large business, and it is state. that there is to be a deal in this stock shortly; the price ruled at from 6@10c. Green Mountain is firm at from 38@40c. Gold Stripe sold at 5c. The price of Quicksilver Preferred was steady at from $31@$31.25; of Common, at from $6.25@$6.50. Plymouth holds its own at from $17.25@$17.63. The Bodies were neglected, and transactions are recorded only in Bodie at from $2@$2.60, and Standard at $1.

The grand old "Ontario" continues to make its stockholders happy; it has just declared its 130th dividend of $75,000, making a total to date of $8,150,000. But little is doing in the stock, and only occasional sales are made, this week a few at $25 a share. Horn Silver is almost entirely neglected, and but one sale is reported at $1.10. We call attention to a letter relating to this company published in another column. Stormont was quiet at 11@12c.

The stock of Santiago Gold Mining Company ha been listed at the Consolidated Stock and Petroleum Exchange. This company owns the "La Guaca" gold quartz mine, situated about 25 miles from the city of Santiago, Department of Veraguas, Territory of Panama, U. S. of Colombia. The report issued shows that the property owned by the company is 13,812 feet long by 13,812 feet wide, for which government title has been duly perfected and granted.

The vein runs northeast and southwest, dipping westerly about 14 degrees, and is 20 feet wide, of free milling gold quartz.

Six hundred tons of ore worked in an arrastra near the mine, yielded $50 per ton in free gold.

The vein has been opened at different points on the surface for a length of 1100 feet, and 600 feet of tunnels and underground workings have exposed a large quantity of ore.

There is plenty of wood for running a large stamp-mill, which can be had for the cost of cutting and hauling, and an abundance of water.

It is the intention to erect a 20-stamp mill. The mine has been placed in charge of John Grodhaus, superintendent. The property has been worked in a primitive way for seven years, the ore being crushed in an arrastra. The company has a capital stock of $400,000—par value of shares, $2 each, unassessable. The president of the company is Mr. Geo. W. Stetson, of this city.

The collapse of the El Cristo deal, this afternoon, has created a genuine sensation on Wall street. Operators are all at sea as to its meaning. Some think that the break is for a "scoop," while others say that the pool brokers met more stock than they could take. The effect on other stocks has not yet been felt, and it is thought that most of the pools can protect their stocks

The stock was in great demand all week, and advanced steadily from $6.37 to $9.50, the closing price yesterday. To-day sold as high as $9.63, and closed at $4.95. The total sales this week amounted to 20,635 shares.

The following securities were sold at auction in this city on the 23d inst.: 100 shares Union Consolidated Mining Company, of Tennessee, $6 lot; $1,000 Dunderberg Mining Company first-mortgage bonds, $16; 100 shares Colorado Coal and Iron Company, 38¾c.; 300 shares Taylor Plumas Gold Mining Company, 6⅝c.

The President of the Consolidated Stock and Petroleum Exchange announced that the exchange will move to temporary quarters at 63 Broadway as soon as needed alterations can be made there. The present building will then be torn down and a new six-story building will be erected on its site.

Coal Stocks.

Previous to yesterday noon, the stock market was as dull and stupid as it could well be Wednesday's transactions were the smallest of any day for months. Up to that time, the fluctuations in the prices of the leading stocks were so small as to exclude outside trading. A few specialties were marked up by professional operators. Yesterday, however, brought much good news.

The Pennsylvania Railroad Company's statement for February was looked upon as very favorable and an index to the prosperity of railroads in general. The Bank of England reduced its rate from 3½ to 3 per cent per annum, and the treasury called $10,000,000 bonds. Money has ruled fairly easy, still there is a fear that there may be a temporary stringency about the first of the month.

Following this, however, it is expected that money will again flow this way, and there is a belief that a portion of the large disburements to be made next month for interest and dividends will find their way into Wall street and benefit the stock market. Toward the close the market became a shade weak, but a strong undertone was still observable.

Delaware, Lackawanna & Western declared its regular quarterly dividend of 1¾ per cent. The anthracite stocks have been quite strong, but outside of Lackawanna, which was depressed by unfavorable legislation, they have only responded to general bullish feeling. The Cumberland stocks have been very quiet and not overstrong, despite the more favorable outlook in the bituminous coal trade. Hocking Coal and Iron Co. has been a feature to the market and shows a marked advance. The outlook favors higher prices for this stock. Colorado coal has been a little better.

Meetings.

The annual and special meetings of the following companies will be held at the times mentioned:

Central Mining Company, No. 76 Wall street, New York City, April 4th, at twelve o'clock M.

Cordova Consolidated Mining Company, No. 346 Broadway, Room 36, New York City, April 11th, from twelve to one o'clock P.M.

Live Pine Consolidated Mining Company, office Hall & Marshall, No. 216 South East Temple street, Salt Lake City, Utah, April 4th, at two o'clock P.M., for the purpose of increasing the capital stock from 100,000 shares to 300,000 shares, by the sale of more shares.

Ozokerite Mining Company, No. 304 Greenwich street, New York City, April 4th, at twelve o'clock M.

Pelican & Dives Mining Company, No. 197 Broadway, New York City, April 5th, at two o'clock P.M.

Peru Steel and Iron Company, Room 28, No. 115 Broadway, New York City, April 5th, at half-past three o'clock P.M.

St. Mary's Canal Mineral Land Company, Directors' Room, Albany City National Bank, Albany, N. Y., March 31st, at twelve o'clock M.

Tennessee Coal, Iron and Railroad Company, No. 8 Noel Block, Church street, Nashville, Tenn., April 4th, at three o'clock P.M.

Union Mining Company, No. 212 South Main street, Salt Lake City, Utah, April 15th, at eleven o'clock A.M.

Westmoreland Coal Company, No. 224 South Third street, Philadelphia, Pa., April 6th, at twelve o'clock M.

Dividends.

Grape Creek Coal Company, of Illinois, coupons, due April 1st, will be paid at the office of the Farmers'

Loan and Trust Company, Nos. 20 and 22 William street, New York City. on and after that date.

Mammoth Mining Company, of Utah, has declared a dividend, No. 1, of $10,000, payable April 1st, at Room 5, Hcoper & Eldridge Block, Main street, Salt Lake City, Utah.

Ontario Silver Mining Company, of Utah, has declared a dividend, No. 130, of fifty cents per share, or $75,000, payable on the 31st inst., at Messrs. Lounsbery & Co., No. 15 Broad street, New York City.

Penn Gas Coal Company, of Pennsylvania, has declared a quarterly dividend of one and one half per cent, payable on the 31st inst., at No. 209 South Third street, Philadelphia, Pa.

Small Hopes Consolidated Mining Company, of Colorado, haa declared a dividend, No. 51, of twenty cents per share, or $50,000, payable on the 30th inst., at No. 1 Broadway, New, York City.

Pipe Line Certificates.

Messrs. Watson & Gibson, petroleum brokers, No. 49 Broadway, report as follows for the week :

The oil market this week has been in *statu quo*. There is absolutely no outside interest, and the professional traders have pretty much abandoned the "bull" ring.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange :

	Opening.	Highest.	Lowest.	Closing.	Sales.
Mar. 19.....	64c	64⅛c	63⅝c.	63¾c.	1,067,000
21	63⅞	64¼	63⅞	63⅞	948,000
22	63⅞	63⅞	63	63	1,059,000
23.....	63⅛	63¼	62⅝	62⅞	737,000
24.....	63¼	63⅜	62⅝	63⅛	857,000
25.....	63⅝	63⅝	63⅜	63⅛	698,000

Total sales in barrels 5,366,000

Assessments.

COMPANY.	No.	When levied.	Delinquent in office.	Day of sale.	Amount
Alta, Nev.....	35	Feb. 9	Mar. 16	April 5	.50
America, Nev.....	1	Jan. 31	Mar. 8	Mar. 31	.05
Belle Isle, Nev.....	10	Feb. 9	Mar. 16	Apr. 7	.20
Belt Cons., Dak.....	2	Mar. 15	Apr. 15	Apr. 30	.01
Best & Belcher, Nev.	36	Mar. 8	Apr. 15	May 5	.50
Bodie, Cal	6	Jan. 24	Feb. 28	Mar. 28	.50
Caledonia, Nev.	...	Mar. 1.	.....	.....	.15
Camp Creek Placer, Cal	1	Jan. 20	Mar. 10	Apr. 14	.10
Comstock, Nev.....	3	Mar. 16	Apr. 18	May 5	.15
Dolores Con., Nev...	4	Mar. 2	Apr. 11	Apr. 29	.05
Eureka, Dak.....	8	Mar. 17	Apr. 21	May 7	.01
General Crook, Dak..	3	Feb. 12	Apr. 1	Apr. 15	⅛
Golden Fleece, Cal..	8	Jan. 27	*Mar. 8	Mar. 28	.10
Gould & Curry, Nev.	55	Mar. 8	Apr. 11	May 4	.50
Hale & Norcross, Nev	...	Mar.	.....	.....	.50
Homeward Bound, Dak.	3	Mar. 18	Apr. 23	May 10	¼
Keokuk, Dak.....	3	Dec. 20	*Mar 15	*Apl. 1	¼
Lady Wash'gtn, Nev	6	Jan. 28	Mar. 7	Mar. 28	.25
Liberty, Dak	4	Mar. 15	May 2	May 19	.01
Lone Jack, Cal.....	1	Jan. 27	Mar. 7	Mar. 28	.05
Manhattan, Nev.... .	5	Mar. 23	... .	.....	1.00
McDonell, Dak.....	2	Feb. 26	Apr. 4	Apr. 23	⅛
Navajo, Nev.....	...	Mar. 14	.. ....	... ...	.30
New Era, Dak.. ..	2	Mar. 5	Apr. 5	Apr. 20	⅛
Nevada Queen, Nev.	2	Mar 10	Apr. 14	May 6	.50
North Belle Isle, Nev	12	Mar. 14	Apr. 19	May 11	.50
Occidental, Nev	8	Feb. 3	Mar. 10	Mar. 31	.40
Phœnix Cons., Cal..	2	Jan. 26	Mar. 5	Mar. 28	1 40
Potosi, Nev.....	27	Mar. 9	Apr. 14	May 4	.30
Ruby Hill, Nev	13	Mar. 4	Apr. 5	May 5	.01
Ruby Bell, Dak.... .	2	Feb. 23	Mar. 28	Apr. 16	.002½
Sampson, Utah.....	...	Mar. 7	Apr. 11	May 6	.25
Seabury-Calkins Cons , Dak	5	Mar. 1	Apr. 9	Apr. 30	.01
Sierra Iron, Cal.....	6	Feb. 17	Mar. 30	Apr. 23	2 50
Silver Reef, Dak.....	2	Mar. 1	Apr. 2	Apr. 18	⅛
U. S. Grant, Dak.	1	Mar. 2	Apr. 4	Apr. 23	¼
West Galena, Dak....	5	June 5	*Apr. 1	*Apr 19	⅛

* The delinquent day and the day of sale .were postponed to dates given above.

Boston Mining Stocks.

[From our Special Correspondent.]

BOSTON, March 24.

There has been a greater degree of activity in the market the past week, and, in spite of the dullness in ingot copper and its lower tendency, prices have been fairly maintained, and in a few instances higher prices have ruled. Calumet & Hecla has been strong and in good demand, although dealings have been in small lots at from $212 to $215 as the extremes—closing to-day at $214. Quincy has held its own under larger transactions than usual in this stock, selling up to $51, but closing as at last week with sales at $50. Franklin declined to $11, some 300 shares selling at that price. There is, however, a demand for it at those figures, and we look to see it sell much higher before it sells under $11.

Osceola is stronger, and advanced from $20½ to $22 with later sales at $21, closing to-day at $21¾ bid, $22 asked.

Atlantic sold at $9, first sale since January 25th, when it sold at $10. Kearsarge also put in an appearance, with sales at $7½, the last previous sale being January 14th, at $10.

Allouez gained an ⅛, selling at $1⅞, and Huron at $1¾, same as last sale. National declined on sale of 100 shares to 50c.

Ironton Iron Company has been rather quiet this week, but prices have ruled steady at $11@$11½, considerable stock finding its way into the hands of investors who have confidence in its value as a dividend paying mine in the near future. Breece Iron has been active, with sales at 55@62½c., and is in good demand at 60c. bid.

In silver stocks, the dealings have been very light. Bonanza selling at $1⅝@$1½, about 4000 shares. The bottom price in this stock seems to have been reached, and another boom is now in order. Catalpa sold at 37½c. Crescent, at 12@13c. Dunkin is very strong at the Mining Exchange at 35@36c., at which price parties seem to be willing to take all they can get. "Cusi" declined to 20c. on large sales, but 20c. is now bid for it, 22c. asked.

Napa Quicksilver sold at $1.

The market closed steady.

Gogebic Iron Stocks.

NAME.	No. of shares.	Pres't value.	NAME.	No. of shares.	Pres't value.
Aurora .....†	100,000	$20.00	Laura	40,000	$4.00
Anvil	40,000	9.00	Montreal	20,000	32.00
Amazon	40,000	4.00	Moore	40,000	4.00
Ashland	40,000	36.00	Mikado.....	40,000	3.50
Agogebic....	40,000	2.00	Minnesawawa..	40,000	4.50
Atlantic	40,000	7.50	Nimikon ...	40,000	11.00
Berringer....	100.000	2.50	Nort'rn Chief	30,000	100.00
Bonnie.....	40,000	8.50	Norway.. ..	20,000	2.50
Blue Jacket.	40,000	7.50	Norrie	30,000	40.00
Black River..	20,000	20.00	Odanah	20,000	11.00
Bessemer....	20,000	10.00	Old Nokomis	40,000	2.25
Brotherton..	80.000	6.25	Pabst.....	250	20.00
Bourne	40,000	5.00	Puritan.....	40,000	22.00
Crown Point.	100,000	2.00	Pence & Snyder I. D.Co.	100,000	3.50
Caledonia....	40,000	3.25	Pence.....	40,000	4.75
Colby.....	*	*	Penokee & G. D. Co	5.000	500.00
Emma.....	40,000	3.00	Palms	40,000	7.00
Father Henepin.....	40.000	4.00	Ryan	40,000	6.50
First Nation'l	80,000	4.50	Superior.....	100,000	3.50
Flor'ce May.	40.000	2.75	Section 33 Co	20,000	11.50
Germania ...	40,000	16.00	Sunday Lake	40,000	7.50
Gogebic I. Sy	200,000	5.00	Snider	40,000	5.00
Gogebic R. & I. Co. (fee)..	40,000	5.00	Trimble	40,000	7.00
Gogebic .	40,000	3.00	Tontine	40,000	4.00
Iron King. ..	40,000	18.00	Union	40,000	3.25
Ironton.....	40,000	12.00	United I. & L Syndicate .	200.000	1.00
Iron Prince..	40.000	3.00	*W L. & Min'l	90,000	1.00
Ironsides	40,000	2.50	Valley	120,000	3.50
Iron Chief...	40,000	5.00			
Kakagon	40,000	12.50			

* See Penokee & Gogebic Development Company. † Includes fee.

The shares of the above companies all have a par value of $25, excepting the Pabst, the Penokee & Gogebec Development Company, and the Northern Chief, which are $100 par, and the Superor and Wisconsin Land and Mineral Company, $10 par.

The prospects of the Gogebic Range continue as bright as ever, and there is a growing interest in these mines. Some prominent New York capitalists have just visited the range, with a view of taking an interest in some of the mines.

The prices given above represent prices on lots from 100 to 1000 shares. In some cases, higher prices would have to be paid for blocks of over 1000 shares. The majority of sales during this week have been made at figures named.

Pittsburg Stock Quotations. Mar. 23.

COMPANY.	H.	L.	Closing
Allegheny Gas Company.....	$35¼	$35	$35
Allegheny Heating Company.....	109	109	109
Bridgewater Gas Company.....	120	115	120
Chartiers Block Coal Company..	40	40	40
Chartiers Valley Gas Company....	91½	88½	90
Consignee Mining Company.....	.50	.01	.30
Forest Oil Company	106	100	106
Gogebic Iron Syndicate.....	5¼	4	4
Hazelwood Oil Company.....	48	48	48
La Noira Mining Company	4	3⅜	4
Mansfield Coal & Coke Company.	...	...	...
Natural Gas Company of West Va	100½	100	100¼
New York & Clevela'd Gas Coal Co	46½	46	46
Pennsylvania Gas Company.....	...	...	...
Philadelphia Company.....	54⅝	53	53⅝
Pine Run Gas Company.....	99	99	99
Silverton Mining Company.....	2⅛	1⅞	2¼
Tuna Oil Company...	69½	62	69
Westinghouse Air-Brake Co.....	102	97¾	99
Westinghouse Brake Co . Lt.....	50	50	50
Westinghouse Electric Company..	96	90	93½
Wheeling Natural Gas Company..	44½	43	44½
Yankee Girl Mining Company....	8	8	8

Highest and lowest prices during the week.

St. Louis Mining Stocks. March 23.

[From our Special Correspondent.]

The only feature in the market for the past week has been the erratic course of West Granite. One moment sellers would appear and the market break with indications of the "bottom falling out," and the next moment it would strengthen up and go higher than it had been. The movement in this stock is watched with great interest, and the reports from the property are anxiously awaited by those dealing in the stock. All other stocks have been stagnant, and there is a dearth of news to report. We refer you to our list of quotations for changes.

COMPANY.	Location.	Bid.	Asked.
Adams, s. L	Colo.	$2.00	$2.25
Courtland.....	Colo.	.....	.25
Granite Mountain, s.....	Mont.	61.00	63.00
Hope, s	Mont.	*6 50	6.90
Ideal, s. L.....	Colo.	.50	.55
Iron Gold and Silver.....	N. Mex.	.....	.03
Laclede....	N. Mex.	... ..	.03
Peacock...	N. Mex.	1.25	1.40
Quincy.....	Colo.	.....	.05
Sheridan.	N. Mex.	.40	.45
Small Hopes Cons., s. L...	Colo.	8.00	8.25
St. Louis & Mex. Imp....	Mex.	1.25	1.30
St. Louis & St. Elmo....	Colo.	.....	.35
St. Louis & Yavapai.....	Ariz.	.90	.95
West Granite, s	Mont.	1.15	1.25

* New stock. Par value, $10.

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DIVIDENDS.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY, 23 NASSAU STREET,
NEW YORK, March 12, 1887.
DIVIDEND NO. 47.

The Board of Trustees have declared a dividend of TWENTY-FIVE THOUSAND DOLLARS, the same being *twenty-five cents* per share of the capital stock of the company, payable on the 5th day of April at the Company's offices in New York and San Francisco.

W. VAN NORDEN, President.

COLORADO CENTRAL CONSOLIDATED MINING COMPANY.

The regular dividend, No. 15, of FIVE CENTS PER SHARE ($13,750) has been declared to the stockholders of this company, payable on April 11th, at the Farmers' Loan and Trust Company.

Transfer-books close on April 1st, reopening on April 12th.

R. V. MARTINSEN, Treasurer.
NEW YORK, March 10, 1887.

OFFICE OF THE ONTARIO SILVER MINING COMPANY, Mills Building, 15 Broad street,
NEW YORK, March 21, 1887.
DIVIDEND NO. 130.

The regular monthly dividend of FIFTY CENTS per share has been declared for February, payable at the office of the company, San Francisco, or at the transfer-agency in New York, on the 31st inst. Transfer-books close on the 25th inst.

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